NOTES 4/2/62 CONSTAN B 4/4

RENOVATION AT MICHOUD

a. Office Building:
   (1) Completed duct work for air conditioning west end.
   (2) Installing chilled water lines from equipment room to fan house. ✓

b. Engineering Building:
   (1) Repairing electrical circuits and lighting, second floor, west end.
   (2) Constructing partitions in center portion (Mason Rust area) approximately % complete.
   (3) Demolition of partitions on first floor in progress.
   (4) Reinstalling plumbing fixtures in progress, approximately 80% complete. ✓

c. Boiler Plant:
   Installing four purge units, four more will be installed upon delivery, which should week beginning April 1. ✓

d. General:
   (1) Splicing electrical cables between main sub-station and boiler plant completed.
   (2) Testing of completed work in progress. ✓

ARCHITECT-ENGINEER DESIGN SERVICES

The NASA A-E has been selected and a Pre-negotiation meeting is to be held with him at ichoud on April 2, 1962. ✓

S-1-C ACTIVITIES

The Boeing Company has developed manufacturing plans for the 5 engine vehicle, as ntrasted to the proposal information based on 2 engines. These plans are not completely tailed nor officially reviewed and accepted, however, a doubling of the medium and high bay ea to be added to the plant is shown. This has serious impact on our AE design funds and of F funds. We will consider this a first priority job for examination and evaluation this ming week. A review of the total funding picture for Boeing's FY '62 requirements is heduled for April 4. F.C. Request briefing on outcome B

S-1 EFFORT

The in-house review of Chrysler Space Division document "Saturn S-1 Stage and C-1 ehicle Program Plans, 1961-1966" is continuing in coordination with M-SAT. ✓

COMPUTER FACILITIES

Although both Boeing and Chrysler have registered written disagreement with a centralized computer facility; our opinion still is that only one facility is justified in the immediate ture. In spite of protests against joint usage, personnel from the contractors are giving cellent support and cooperation in planning this facility.

Cy marked items furnished Dr. Lange 4/5/62

Oswald Lange

Request briefing. B ✓

Mac

It would appear that once we are committed to this "centralized" approach it'll be forever. What's the reason for CC's and Boeing's opposition?

B

B4/4

NOTES 4-2-62 DEBUS

I talked with Rees. Subcommittee, "overflight is O.K." Seamans was there and was very mad about it. Jerry B

1. Subcommittee on Manned Spaceflight Hearings: At the hearings in Washington on Thursday, March 29th, I understand from Rees that; the DOD delivered a "prepared position" on the new land at CCMTA which Rubel had not coordinated with Seamans. Rees will probably report directly to you on it. Some very pertinent questions were asked in writing by the Subcommittee to both DOD and NASA. I will send you a copy with my suggested answers which I furnished to Holmes' office. ✓

→ Good. I am greatly interested B

2. Umbilical Connections for C-5 Stage: A compromise location was arrived at for the umbilical connections on the S-IC, S-II, S-IVB, and APOLLO stages. The umbilical will be located 73° off the flight direction (with the S-I booster and S-IV stage this angle is 58°). The proposed location allows the S-IVB stage and APOLLO capsule to be launched from Complexes 34 and 37 and the VLF-39 umbilical tower can also handle the S-I booster. ✓

Orientation of the VLF-39 launcher transporter will be N-S, with flight direction due East. MSC has been informed of the change and was requested to comment within 30 days on whether there will be any problems with this location for the APOLLO umbilical. No action required. ✓

3. CTL: Jupiter preparations are progressing on schedule with no major operational difficulties at this time. Propellant Fast Loading Test is scheduled for Tuesday, April 3rd. ✓

4. Centaur: Centaur launch has been scheduled for April 6, 1200 - 1600 EST. ✓

5. Saturn: SA-2 checkout continues on schedule with a minimum amount of operational difficulties. A decision was given by Weidner to fly SA-2 with evidence of a small leak at the lox dome on engine #4, after discussion with his own people, Test Division and Rocketdyne. It was the opinion of all concerned that the leak which shows up at the low test pressure would either not occur under full operating pressure or would be small enough so as not to cause a fire problem. ✓

6. Task Force for Cut Over to LOC: A task force will be formed of representatives from MSFC-MSC and NASA Headquarters to assist in resolving all problems connected with establishing LOD as LOC. Young will be here Tuesday to discuss functions and responsibilities.

→ What happened, meanwhile? B 4/4

7. Range Destruct Action: Range destruct action was taken last Friday on a new Polaris version. Parts, pieces, and propellant fell in the areas of 26 and 56. No damage occurred. One of the largest pieces fell behind the lox revetment in #26 which shielded the CTL Jupiter on the pad from possible damage. We will have a complete report on it later, including pictures. ✓

NOTES - GEISSLER - 4-2-62 B 4/4

* 1. SA-5 SHROUD: The back-up shroud for the Apollo tower has been eliminated for SA-5. A Jupiter nose cone configuration with a Q-Ball alpha meter will be designed and constructed by MSFC. It has been determined, however, that permissable angles-of-attack on SA-5 are small and the use of an alpha meter or accelerometer will be required. If the Apollo escape tower is satisfactory from an aerodynamic point of view, then the tower stiffness will be the principal remaining problem. A decision should be made in the next two weeks between accelerometer and alpha meter control and at this time a firm statement can be made as to the required stiffness of the tower. M-AERO personnel are considering a trip to NAA during the first week in April to obtain first hand information on the tower stiffness problem.

→ Willy Mrazek

Please keep me posted re what configuration and what hardware solution (cannibalize Dynamic Test Bird?) has been chosen B

NOTES 4-2-62 GORMAN B 4/4

CENTAUR CONTRACTS (See Notes 3-26-62 attached) As we agreed last week, I am going to get involved personally in the Centaur contracts problem. I plan to talk to Bill Davis today and work out a way to accomplish this. ✓ H.G. Please keep me posted, B

PRATT AND WHITNEY CONTRACT - Modification #16, the subject of an Urgent Action last week, has been cleared and released to Pratt and Whitney. All is well, at least for Modification #16. ✓

PRESIDENT'S COMMITTEE ON EQUAL EMPLOYMENT (See Constan's notes 3-26-62 attached) In response to your note of last week, Paul Styles will be in attendance at the three day session. Paul is personally acquainted with John Field, Executive Director of the President's Committee. ✓

NOTES 4-2-62 GRAU B 4/4

1. CHANCE VOUGHT CONTAINER CONTRACT: Difficulties have been experienced concerning coordination between governmental representatives and contractor personnel. Contract changes are being prepared to clarify contractor responsibilities and precisely state the different functions to be performed by MSFC personnel. ✓

2. LOD CONTRACT FOR COMPLEX 37: Discussed with LOD personnel inspection coverage during manufacture of pneumatic panel and valve boxes for Complex 37. Specifications were reviewed and requested changes agreed to and made by LOD. A survey of Noble Company, Oakland, Calif., as prospective bidder was arranged with Quality Assurance Division personnel stationed on the West Coast. ✓

3. PRATT & WHITNEY: Detailed receiving inspection procedures for use of contractors (GD/A & DAC) have been completed. Division representative will report at East Hartford on April 2 for an extended period. This Division presently has seven people permanently stationed at West Palm Beach and four on Temporary duty. Two additional engineers have been hired and will be aboard early in April. ✓

4. CENTAUR: According to a Memorandum of Agreement signed on March 22, 1962, the Air Force will perform inspection services on Centaur at General Dynamics/Astronautics, within the limits of resources provided, in accordance with NASA Quality Control Procedures. Utilizing the Propulsion Test Vehicle, a successful 280-second firing of Pratt & Whitney engines was accomplished at Edwards Air Force Base on Thursday, March 22. ✓

Good !

5. QUALITY REPRESENTATIVE AT P&C: Quality Assurance Division placed a man at P&C to help carry out the intent of MSFC Policy concerning the inclusion of quality requirements in contracts. Negotiations are proceeding with the various divisions to also provide a Quality Assurance Division man in their areas for purposes of coordination and advice in these matters. ✓

6. TITAN III COMMITTEE: After nomination of two more members to support Mr. & Mrs. Neighbors (as discussed in the Board Meeting, 3-30-62), MSFC was advised that only two members are permitted. Therefore, the electrical engineer (M-QUAL) and the solid propellant motor engineer (M-P&VE) cannot participate. ✓

NOTES - HAEUSSERMANN B 4/4

4/2/62

1. GROWING PROCUREMENT PROBLEM: During recent months we have experienced an increasing number of problems in this activity which seem to be centered around procedures, regulations, and unfamiliarity on the part of the groups involved in the procurement cycle as to the minimum requirements which must be met to assure orderly and expeditious handling through the processing channel. The general problem has received considerable attention here of late and we are hopeful of experiencing improvements in several respects. The recent installation (on a trial basis) of the data link system which provides a means of rapid transmission of procurement requests from this division to T&ME, and then on to P&C plus attendance of MSFC personnel at the NASA Headquarters sponsored Procurement Management Seminar at Cocoa, Florida, and the frequent discussions between the major elements involved in this general problem. All have played a part in establishing some means of providing improvements in this area. "Time" seems to be the major source of continuous trouble and now that we find ourselves in the close-out phase of the fiscal year, this particular item becomes even more critical particularly in the case of P&C. Appreciating the fact that their load is of a sizable volumn, it may be desirable to look into the possibility of some relief being offered that activity in the form of temporary loan of personnel from within MSFC or possibly from other NASA elements.

2. BOEING, CHRYSLER MANNING SCHEDULES: Boeing S-IC Contract NAS8-2577 schedule which calls for 18 people to be on-board as of this date is running considerably behind in that only five people have reported in. The Chrysler S-I Contract NAS8-2576 schedule which calls for 40 people to be on board as of this date is running slightly behind in that only 35 had reported in. ✓

3. SUPPLEMENT TO CHRYSLER CONTRACT COVERING MSFC VEHICLES: The additional Astrionics requirements scheduled for inclusion in the Chrysler Contract NAS8-2576 which involves component testing, design, draft, and fabrication support in connection with vehicles through SA-9 just reached P&C last week. In conference with the negotiators 4/2 the request is being handled on a high priority basis. Early contractural coverage is most important if tasks supporting SA-5 and subsequent vehicles are to proceed on schedule. ✓

Harry Gorman

What do you think of (2)?

B

NOTES 4/2/62 Helmburg B 4/4

1. LIQUID HYDROGEN FACILITY:

A 30-second cold flow and turbine spin-up test was successfully conducted on the RL10A-1 cold flow engine, Saturday, 3/31/62. Weighing system, level gauge systems, flowmeters, and other instrumentation were checked out. ✓

2. S-1-3:

* Preparation of S-1-3 for acceptance test firing is on schedule. Propellant loading tests will be conducted Wednesday, 4/4/62. Short-duration firing is tentatively scheduled for 4/10/62. Full-duration firing is planned for 4/20/62. ✓

3. H-1 Heat Exchangers:

The evaluation of representative units of H-1 heat exchangers fabricated by Martin Company was completed. It was concluded that these units, as received, are not directly comparable in performance to heat exchangers fabricated by Manufacturing Engineering Division. The Martin units can be made to compare, however, if the tubing is given the same internal etch-cleaning that the Manufacturing Engineering Division heat exchangers received. ✓

4. MARINE EQUIPMENT:

A preliminary survey of available marine equipment was made the past week at the Charleston (South Carolina) Army Transportation Corps Reserve Fleet and the Charleston Navy Yard. A number of vessels at the Army T.C. Reserve Fleet seem suited for our needs. A "blanket hold" on all (584) vessels in the Army T.C. Reserve Fleet was arranged to allow us to prepare the "Justification for Acquisition", which will be presented Wednesday, 4/4/62, at NASA Headquarters, Washington, D. C. ✓

K.H. Please keep me posted on outcome B

5. SUPPORT CONTRACTOR FOR MISSISSIPPI TEST FACILITIES (MTF):

Test Division was visited on Thursday, 3/29/62, by a team from Dr. Finger's office, headed by Col. Schmidt, to inquire as to our plans for use of a support contractor for certain operations at MTF. This team planned to visit several different installations over the country to get ideas and to help them formulate plans to establish a single support contractor at Jackass Flats.

Investigations are continuing to develop a workable plan for support contractor utilization at MTF. A team composed of Mr. Marion Kent, Dr. W. H. Sieber, Mr. W. L. Grafton, and a representative of P&C will visit Col. Schmidt in Germantown, Monday, 4/9/62, to get information concerning his team's findings and will follow-up this meeting with visits to other installations to fully round out our information on this subject. ✓

K.H. Please send me their final report (or an excerpt of it) B

NOTES 4-2-62 HOELZER B 4/4

Negative report.

[redacted] B 4/4

NOTES 4-2-62 HUETER

c. Pad 36B: The Corps of Engineers has advised LOD that unless a DX priority can be established for AMR Pad 36B construction, the required availability schedule of Mar 1 will slip. LOD advises that all other launch facility construction projects have a DX priority. The Centaur Project Office requested the assignment of a DX priority some months ago but no affirmative action has been received.

d. Notes 3-12-62 Hueter: Reference to your notation to my Notes of 3-12-62. A letter has been prepared in response to Dr. Newell's TWX of Mar 12. It is currently in your office for signature.

2. AGENA:

a. Gemini: A structural interface meeting was held at Houston last Thursday with MSFC, LMSC, McDonnell and MSC participating. Another meeting is scheduled for Apr 5 when LMSC will present a report on capabilities of the Agena to control Agena-Spacecraft after docking and a G&C accuracy report on planned maneuvers.

b. Agena-D: MSFC's recommendation to accept the Agena "D" version has been forwarded to NASA Headquarters. If accepted by Headquarters, the standard Agena would be used on all NASA missions beginning in early CY 64.

c. Catastrophe Spares: Something over two million dollars is expected in the 4th quarter funds to provide catastrophe spares for Agena-Centaur and Atlas pads at AMR. Pads 12, 13, 14, 36A and 36B are to be considered in this program. Plans are for MSFC to administer the Centaur portion of the program and the Air Force to administer the Agena and Atlas portion.

d. The Lunar and Satellite Vehicle Integration Panels: These panels met the 21st of this month. Some of the major problems handled were: The interchange of flight interface items prior to launch, structural problems of the S-27 spacecraft interface hardware, Mariner-R separation system modification, Ranger follow-on shroud instrumentation program, satellite shroud venting systems and shroud structural design problems.

From Glenn?
B

[redacted]

NOTES 4-2-62 Koelle

B 4/4

1. NOVA

A memo concerning the number of engines for NOVA is on the way to you with the recommendation that the 10 + 2 + 1 configuration be selected for detailed preliminary design in our contract effort. If you like this recommendation, please forward to Mr. Rosen for comments. Mrs. Rear may want to comment on this - Mac O.K. let me talk to him B

Frank Williams hopes to have his report on the preliminary evaluation of the NOVA proposals ready for the Source Evaluation Board on May 3. Which date between the 3rd of May and the 8th of May can you set aside for the meeting of the Source Selection Board? We plan to prepare criteria and procedures in writing and request comments from the members of the Source Evaluation Board prior to that meeting.

2. NEW STUDY CONTRACTS

We expect to let eight study contracts in the next eight weeks. Each contract is in the order of 100,000 dollars. On the first one (which is a conceptual design study of a reusable carrier vehicle in the C-1 class for the 1970 time period) we should be ready by this Tuesday afternoon with a recommendation as to whom the contract should be awarded. How much detail do you want on it? Is a one-page note to you good enough or do you want to have a little discussion on this and the other seven studies? HHK ½-1 page per contract, yes. B

3. FACILITIES ← call Koelle & ask if he means environmental facilities? Mr Koelle says he means mainly environmental, but not entirely. JPM 4-2 B 4-2

There are two broad problem areas: (1) Facilities MSFC might want to make a pitch for. This question will be studied by the special committee set up last Friday. (2) The overall requirements for facilities from the national viewpoint have been studied recently by Mr. Ball of our office. The material available indicates that NASA is facing a big problem. We would like to discuss with you the question of whether we should at this time bring this to the attention of Dr. Seamans. Mr. Ulmer, with whom we talked with over the phone, is anxious to get our material and recommendations. We need your guidance on this subject and have requested a meeting with you which is tentatively on your agenda for Wednesday at 3:00 p.m. Dr. Rudolph is also invited; he might be a good man to take over now. ✓ HHK We must first coordinate with the Brained Holmes' office! B

4. POSITION PAPER ON SOLIDS

We have sent out five (5) copies each to Seamans, Holmes and Rosen over your signature. We propose to make wider distribution only after their comments are in. ✓

NOTES 4-2-62 KUERS B4/4

* 1. Saturn Block II: Plans are underway to transfer to Chance Vought the major tooling used for the in-house Saturn Tankage Program which is adaptable for the Block II design. This tooling has an estimated value of 0.5 million and consists of the following: Circumferential Weld Fixture; Bulkhead Hold and Pull-In Fixture; Forward and Aft Assembly Fixtures; Mechanical Weld Fixtures; Aroson Positioning Fixtures; and, 19 items of support tooling. The effect of this transfer will be to decrease the overlapping of manufacturing schedules at Chance Vought between Chrysler Space Division and MSFC requirements. This is another typical example where in-house concepts and experience in fabrication are being fully transferred and utilized by a major contractor, thus assuring that identical and reliable hardware will be produced.

2. Instrument Units, C-1, C-1B, C-5: I have discussed with Astrionics Division the concept of development of Instrument Units for the C-1, C-1B, and C-5 programs. I agreed to carry out the structural work for these programs in-house. Time-wise this program will not interfere with structural work for the C-5. I feel that this load will be of minor proportions after development of the first few units and, therefore, will not tie-up our capacity to handle any major project such as the Tanker Program.

NOTES 4-2-62, Lange

B 4/4

1. C-1:

S-IV: In order to overcome the manufacturing difficulties of the common bulkhead as reported earlier the following rescheduling is under study: SA-6 will become the wet test vehicle, for fill and drain test, at the Cape, the all system and dynamics vehicle will be interchanged; therefore, all S-IV schedules can be met provided there is a 4 month interval between SA-5 and SA-6 launch as presently scheduled.

The interstage honey-comb will be left in the all systems vehicle and further steps are under study and will be reported with the next notes.

2. C-5: Major problem is still a resolution of the official schedule agreement with HQs and official notification so contractors can plan accordingly.

S-IC: The status of Boeing build up on S-IC as of March 29 is as follows: 710 total people are-assigned to the program; 526 are located in Huntsville, of which 142 are located in the MSFC divisions.

S-II: Facilities action has been placed in the "Urgent Action" category by TWX MSFC to Headquarters.

MSFC has requested SGID furnish copies of the subcontract proposals for the S-II hydraulic actuators. The purpose is to make an independent evaluation for comparison with the SGID proposed selection. Mutual agreement is expected between MSFC and SGID before final committing to development.

S-IVB: A statement of work for continued S-IVB studies and preliminary design effort for the period Apr 1 thru July 31, 62 has been coordinated with the appropriate MSFC personnel and was forwarded to WOO for contract implementation with DAC. This action was necessary to maintain continuity in the S-IVB effort since this work was to terminate 3-30-62 unless extended. In view of the recent optimization studies leading toward larger diameter and increased propellant loading, the present extention can be redirected to incorporate new findings as early as they are firmly established.

The contract proposal documents with cost estimate for S-IVB as a basic escape stage for C-5 (200K propellant loading and 220 inch diameter) are expected to be received from DAC 4-2-62.

3. Apollo: First weight breakdown of Apollo command module, service module, and escape system and first sketches of configuration (lacking detail) have arrived from North American Aviation, Inc.

The procurement of a proper Apollo type payload for SA-5 is under review and will be submitted as a separate report by mid-week.

4. Funding: The SATURN Program has FY 63 C of F requirements that are not in the President's Budget, i.e., S-II acceptance stands (MTF), S-IVB test facilities, etc. An exercise must be started to bring these items into focus by an overall look at the FY 63 C of F budget. Some reprogramming between NOVA and SATURN appears necessary to obtain a solution.

Suggest we do this after selection of "mode"

O.L.

I don't think Hq. will be ready to sign off on a final overall schedule before questions such as "mode" & "true moon" or "CI vs CIB - three-stages" have been resolved. What is wrong with checking with Hq. whether "for lack of a final master plan we couldn't give contractors our new schedules for program guidance." It's all we can accomplish anyhow. B

NOTES 4-2-62 Maus B 4/4

1. REFERENCE MEETING WITH DR. SHEA, APRIL 2 & 3: Additional information received by Joe de Fries indicate that Dr. Shea will attempt to arrive at a mission profile description, and an outline of specific problem areas for assignment to the Centers. He explained that the meeting would be of the same nature as the March 13th Earth Orbital Operations meeting in Washington. Dr. Geissler, Mr. Horn, and Mr. de Fries will attend. ✓✓

2. STEERING COMMITTEE ON 3 STAGE C-1 VEHICLES: I think you know about the meeting coming Thursday at OSS called by John Sloop in which payload missions inclusive Prospector will be discussed. Dr. Shelton (RPO), Stan Reinhartz (SSO), Mr. Schwaninger (AERO), and Mr. Madewell (for Wilson Schramm) will represent us. I will bring this to the attention of Dr. Geissler in case he might want to stay over and attend personally. Hope Pickering will be represented, tho B

3. HEADQUARTERS DIRECTIVE ON SCHEDULING: A joint meeting for April 3 & 4, has been called by Mr. Lilly in OMSF with MSFC, MSC, & LOC concerning proposed OMSF schedule procedures and other scheduling matters. MSFC representatives will be Jay Foster and Bud Abbott. ✓

4. FY-64 INSTITUTIONAL BUDGET: The FY-64 Institutional Budget proposal, due April 9th, is being reviewed with representatives of FMO and will be submitted for your signature shortly. ✓

5. PERT: "Our CP office..." ~~We~~ are working with Saturn Systems Office to go operational on PERT for SA-5 within 2 weeks. In addition, we are working on reducing the significant milestones to approximately 100 - 150 events to provide an operative PERT reporting system to headquarters. ✓

Our CP...
We have assisted LOC in PERTING most of the AMR facility projects. A meeting is planned for Tuesday or Wednesday of this week with North American S&ID Division to advance the application of PERT and financial reporting for S-II contract. ✓

* Jon

NOTES MRAZEK 4-2-62 B 4/4

1. RIFT PROCUREMENT: The RFQ issued 2-26-62 was returned through NASA Procurement 3-26-62 as scheduled and the proposals of all companies are now under evaluation. ✓

2. SA-5 ITEMS:

a. LOX AND FUEL TANK FLANGES: Chance Vought received bad run of flange material (5456) from Alcoa. Contained inclusions of foreign material (chrom, manganese, and iron). Flanges will be cut off and new ones of plate stock, ultrasonically inspected before fabrication, will be welded on. ✓

b. FUEL TANK SKIRTS: Modification of upper portion of rear skirt with overlay of skin and external rings for test only will start next week. Testing scheduled in about three weeks. ← I thought this reinforcement will only go into SA-6 and subsequ. B

c. BENDING MODE ANALYSIS OF SA-5 + APOLLO + ESCAPE TOWER: Vehicle on pad, full and empty, plus six time points in flight were investigated. Partial results were: 1st bend frequency, 1.84 cps (full), 2.54 (C.O); on pad (cantilever) 0.44 cps (full), 0.52 cps (empty). ✓

d. UPPER TAIL SHROUD TEST ITEM: Two support rings for shroud segment holding up tests. Two weeks behind with further slip anticipated. ✓

e. 70" LOX TANK TEST: 70" (short tank) testing will begin next week. ✓

f. AUTOMATIC SYSTEMS CHECKOUT: A procedure for automatic systems checkout of the control pressure subsystem for the S-I stage of SA-5 has been prepared. Note: study is based on recommendations of recent electro-mechanical automation sub-board meeting, and is accomplished with a minimum of vehicle hardware changes. Procedure is currently being evaluated, using techniques of failure effect analysis to establish justification for the individual test objectives; additionally, a functional analysis for this proposed test and checkout procedure is being accomplished to ensure systems integration. Similar effort also has been initiated for fuel pressurization and Lox pressurization subsystems. ✓

g. AUTOMATIC SEQUENCE: A preliminary functional analysis for SA-5, which identifies total number of interlocks for vehicle and complex, has been completed. This accomplishes phase 1 of a total review directed toward simplifying the automatic sequence. ✓

h. MOVIE CAMERA PACKAGE: A movie showing balloon inflation safety test at Cook Technological Center has been received. Test shows balloon inflation is not dangerous except for first eight inches of travel of the balloon cover-flap assembly. Flap-retainer cover will be made with an eight-inch crushable protective guard on rear. Engineering Materials Branch is developing crushable guard using a cylinder of heavy foam rubber.

2. SPECIFICATION ENGINEERING: "Specification Engineering Group" was established under supervision of Chief of Engineering Procedures Section. This group is being staffed by Boeing personnel and the purpose of this group is to maintain applicability lists, review existing government specifications with the object of keeping these current, investigate the need for new specifications, coordinate the preparation of new specifications, and review contractor-submitted applicability lists and deviation requests. ✓

W.M. What is an applicability list? B

3. S-II MECHANICAL WORKING GROUP: Discussion details of working group are given in attached memorandum.

Attachment: Memorandum, subject: Working Group Activities

W.M. Don't know what you are talking about. Please elaborate (½ page) on attachment to next Notes. B

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Mr. Mrazek, M-P&VE-DIR DATE April 2, 1962

FROM H. R. Palaoro, Chief, Vehicle Systems Integration Office

SUBJECT Working Group Activities

B 4/4
Mr. Palaoro
See my remarks, please.

S-IV Stage

1. In my last week's notes, I stated; at this time the S-IV stage appears to be still on time, but with no margins for any mishaps left.

2. During this week we have had it. After load testing of the S-IV All Systems Vehicle during which the front interstage was damaged, a leak test was performed on the common bulkhead with 50 psi helium. The inner aluminum sheet debonded in several places (up to 4 ft bubbles). This bulkhead cannot be used for the All Systems Testing. Probable solutions:

a. Accept the Dynamics Vehicle as is, proceed with assembly, and stiffen the front interstage with doubles. Delay in delivery; a few weeks.

b. Cut out the lox tank from the All Systems Vehicle and use the SA-5 lox tank and weld it into the All Systems Vehicle. This will delay the All Systems testing at Sacramento by at least one month and cut out certain tanking and other pre-firing tests, which would be highly desirable but maybe not mandatory. This delay probably permits the engine installation at Santa Monica since they were the pacing item.

c. SA-5 can probably be manufactured on schedule by using the SA-6 lox tank.

d. The problem at this time appears to be the time left to test the All Systems Vehicle before SA-5. Only one month is left if everything works out fine.

e. We are going to have O'Neal from DAC here on Wednesday to discuss this whole mess in detail and arrive at some solutions. We will have Structures, Materials, etc., in the meeting.

3. The helium heater testing had to be interrupted due to hydrogen shortage.

MSFC - Form 488 (August 1960)

Cy this Memo furnished Dr. H. L. Palaoro, 4/5/62

e., Structural load assumptions, vibrations, acoustics, etc. were discussed. Internal reports and design ground rules were forwarded to S&ID for guidance.

f. Discussion of material aspects were held. There are some questions on the bonding material selected for the insulation. They selected a high temperature material, which apparently does the trick also at -423°F. Also welding problems were discussed. The presentations given during this meeting gave the appearance as if everything is settled. The facts don't bear this out. Dr. Lucas will look closer into these items since the S&ID specialists weren't available.

What facts? B

g. Several pre-meetings were held to arrive at a decision here on the stage vs engine mounted hydraulic system. This required coordination between Douglas, S&ID and MSFC since we want to have as much as possible common hardware in the vehicle. We decided on the stage mounted system and a scope change will be forwarded since the present design calls for an engine mounted system. The stage mounted system is more flexible and can be easier adapted to changes, much less coordination between engine and stage contractors required.

h. The propellant utilization system approach and status were discussed. Here again, we want to utilize the experience and design accumulated by DAC and if possible use developed hardware. Coordination meetings between Douglas, S&ID, Rocketdyne and MSFC appears to lead to a common solution. In about 2 weeks a review is scheduled at Rocketdyne since the propellant utilization valve on the engine is involved.

i. The aft interstage environmental requirement was reduced from -200°F to -100°F. This is still a pretty severe environment for many components and will require separate conditioning methods. Also the requirements for S-II and S-IVB may vary.

j. Interface problems, access requirements and servicing provisions were discussed and documentation is being established. One problem is the installation of explosives. All these items are to be installed at the Ordnance Tower. In some instances, as the shaped charge for separation, this may be extremely difficult. We will arrange a review with LOD on the actual requirements, intentions and provisions of the Ordnance Tower concept.

k. S&ID presented their scheme for leak detection for the external insulation. A series of connectors is attached to the external insulation sheets to check areas with helium sniffers. They will use only 2-5 psi for their checks.

SUBJECT: Working Group Activities April 2, 1962

1. We shortly touched on the base heat protection. Several methods of attaching the heat shield are being investigated in conjunction with Vehicle Systems Engineering Branch, Propulsion and Vehicle Engineering Division.

3. The responsibilities of the Working Groups involved in this were outlined by me as follows:

a. The Dynamics and Control Working Group is responsible for the aerodynamic flow field, the base pressures and temperatures created during flight around the base area.

b. The Vehicle Mechanical Design Integration Working Group is responsible for the interpretations of the thermal environment into engineering data for material and design selection and the engineering of the protection.

S-IVB Stage

1. Mr. R. Griner reported to work and as S-IVB Project Engineer is beginning to take over coordination in this area.

2. The scope of work is being released to DAC covering the period April 1 through July 31, 1962.

3. The attitude control system is eliminated from the DAC scope for the time being to permit MSFC further definition of the requirements. Astrionics Division requests to have 3 DAC personnel here at MSFC to prepare the design specification for the attitude control system. I was asked if I had any objections, since this is one of those overlapping areas between our Divisions. I agreed to the people, providing the specification will be prepared with proper coordination between the responsible organizations. It is my understanding that Astrionics Division is responsible for the establishment of the control requirement and the electronics involved and Propulsion and Vehicle Engineering Division is responsible for the implementation of these control requirements through the development of the propulsion and hardware system to provide the necessary muscle. It might be advisable to discuss this with Dr. Hauessermann before anyone goes off in the wrong direction.

Mr. P. That's my interpretation, too! B

Yes

S-I Stage

We are finalizing the procedures for documentation release and responsibility turn-over to Chrysler Corporation, and the change Control Procedure. A meeting on this was held at Michoud this week, Jack Haire and George Thrower attended.

SUBJECT: Working Group Activities April 2, 1962

S-IC Stage

A preliminary discussion was held in my office with Boeing on the subject of Engineering documentation and control of the S-IC flight stages. At this time, we see it the following way:

We want only one design for our static test booster and the Boeing flight booster. Since we make ours first, this is also the design for Boeing and they help make the drawings and specifications. We will probably permit Boeing to change the letter M in our drawing numbers to B, (example: 10M0005 to 10B0005), but otherwise use exactly the same drawing and we will probably control all changes thru the Configuration Control Board as we do with Chrysler at least thru SA-505. Boeing may not like this, but this is the basis on which they will prepare a counter proposal within the next 4 weeks.

Mr. Palaoro Sounds good to me Please keep me posted on Boeing's reaction B

Apollo

The first meeting of the Saturn-Apollo Mechanical Integration Panel will be held on the 12th of April in our conference room.

The agenda is as follows:

a. Define coordination channels. (MSFC-MSC)

b. SA-5 and SA-6 missions. (MSFC)

c. APOLLO configuration, orbital and re-entry spacecrafts and dynamics version, shrouding, launch escape propulsion system configuration including "q" ball, weight distribution, and separation requirements. (MSC)

d. Mechanical interface areas, destruct system, and safety requirements. (MSFC)

e. Spacecraft launch complex requirements, umbilical connections, service accessibility, etc.. (MSC)

f. Structural data (spacecraft). (MSC)

(1) EI diagram for entire spacecraft.

(2) Vibration levels during boost.

(3) Loads in-flight and handling or transportation.

(a) Longitudinal force.

(b) Bending moments.

(c) Shear.

Mr P, I hope we have a clear procedure for the SA-5 back-up nose by then! I discussed this with Mrazek. B

SUBJECT: Working Group Activities April 2, 1962

(4) Safety factor used in APOLLO design.

g. Environmental conditions. (MSFC)

(1) Preflight and in-flight air conditioning.

(2) Status of air conditioning barrier requested in SA-5 and SA-6.

h. Acoustics level during the various phases of launch. (MSFC)

H. R. Palaoro

H. R. Palaoro

NOTES 4-2-62 Rudolph B4/4

1. "Decision Summary" (Condensation) on Docking Test Program meeting with Shea. I sent copy to you on March 29 for your comments.

   Please disregard as written since requirement for selection of optimum mode as established in last Management Council Meeting makes parts of it invalid. ✓

2. Ground Test Facilities: Regardless of mode chosen (further down the road) urgent requirement exists for investigation of need for Environmental (Vacuum) Test Facility Nationwide. Major (now Col.) Hunt of Corps has gotten O.K. from Wash Army on Lunar Environmental Facilities. We can approach Schomburg now if we so desire. JCM 4-2

   I am aware of Koelle's efforts and have talked to him: he gets the ball rolling, I'll push it further with Shea. ✓

   Therefore, I'll be in your meeting with Koelle on Wednesday, March 4, 1962 at 3:00 PM. ✓

   Also will bring along Friedrich Dhom, whom I know you well remember - and whom I just hired for reliability and associated areas (for instance environmental criteria and facilities). ✓

   ↑ !!

3. Space Electronics & Telemetry Symposium:

   I might not be able to make Koelle's meeting with you (but Dhom will be there) because I have to run a meeting in preparation for the Space Electronics & Telemetry Symposium of which I am National Chairman.

   The Symposium will take place on 2, 3 & 4 October 1962 at the Fountainbleau in Miami, Florida.

   You might remember that I talked to you once before on that. I like to repeat my plea to have you as the dinner speaker on 3 October 1962.

   I wouldn't like to have anyone else but you.

   I realize, of course, that I am asking you for a great favor and that it is still a bit long til October - but couldn't you mark that day on your calendar?

Stuhlinger B 4/4

NOTES 4-2-62 ~~Haller~~

1. PROJECT HIGH WATER: The Saturn water release experiment has been given final approval from Dr. Newell's Office. You should receive more formal notification of this from Headquarters early this week. The project is proceeding as scheduled and will cause no delays to SA-2. As you requested in last week's NOTES, we are preparing a short (1/2 hour) presentation to you on this project for the very near future. ✓

2. HOUSING FOR RPD: We are making preparations for the move of RPD from Building 4488 to Building 4723. We have studied the layout of Building 4723 and are drawing up modification requirements. In response to Mr. Neubert's verbal request, we are also considering requirements for a new building to house RPD, and will have preliminary plans and a cost estimate ready for inclusion in the FY 1964 budget submission. ✓

3. CHARGED PARTICLE SHIELDING: Dr. Shelton visited Dr. Duberg of Langley and Mr. Faget of MSC in an effort to establish coordination with these centers on charged particle shielding activities. Mr. Faget plans to set up a space physics division at MSC in the near future. ✓

E.S.

I greatly appreciate this understanding and cooperation in this matter. I hated to ask you for this, but there was no other way out.

B

NOTES WEIDNER 4-2-62

B 4/4

1. ENGINE PROGRAMS:

F-1: Rocketdyne was invited to review F-1 and J-2 funding status. F-1 and J-2 programs are expending funds at a rate higher than contracted for, and additional funds would be required for FY-62. Rocketdyne was informed that expenditure rate is to be scaled down to a level consistent with present program funds. Realignment of schedules (PERT) consistent with the C-5 engine delivery dates will be considered at time follow-on R&D program is negotiated. Over-run cost figures (no fee) will also be negotiated at same time. Specially instrumented F-1 turbopump number 013 was run with water in the LOX system and RP in the fuel system; test duration one second. Premature cutoff was caused by excessively high discharge pressure. Details are unavailable at this time.

J-2: Due to breakdown of hydrogen plants in Florida and California, all engine and component testing has stopped; limited testing will begin 3-30-62. A test into mainstage (400 Milliseconds duration) was accomplished on engine number one during this report period. This test included gas generator ignition. A two and four second mainstage test is scheduled for this week.

M-1: Latest estimated date for letting of M-1 Engine Letter Contract is between the 2nd and the 6th of April, 1962. Procurement action within MSFC has been initiated pending fund obligation authority from NASA Headquarters. Mr. Rosen and Mr. Tischler of NASA Headquarters have agreed that a sound and more realistic M-1 engine development program should be planned.

RL-10: Liquid hydrogen fuel continues to be a problem. AF Florida Plant was shut down again for an estimated two days. Middletown Air Material plans to shut the plant down for a two-week period (starting either April 14 or April 21) to accomplish repair and convert to natural gas operation. The Engine Management Office is opposed to shutting down the plant until the new LH_2 plant on the West Coast begins operation (approximately June 1962), and has informed NASA Headquarters of this stand. NASA Headquarters personnel will request the Air Force to keep Plant #74 in operation until June 1962. This has been done - JCM 4-2

2. COLD FLOW TESTS ON ENGINE 1708: Two successful cold flow tests on engine 1708 have been conducted by Douglas on the S-IV battleship test stand at Sacramento. Cooldown times were 25 and 20 seconds; however, applied tank pressures were higher than flight values. Had operational difficulties with LH_2 fill and drain valve and with LOX prevalve (both stuck).

April 9, 1962

OFFICE - OF DIRECTOR

MSFC ROUTING SLIP

	CODE	NAME	INIT.	☐ ACTION	☐ INFORMATION
1					
2					
3					
4					

REMARKS

Mr. Gorman.

If this has in fact been settled, as I were indicated, then we can drop it as far as I am concerned - I leave the action to you -

JCM 4-11

CODE	NAME	DATE

MSFC - Form 495 (Rev. February 1961)

This is the draft of TWX which was sent to Holmes. Bendix

Item 5: (Haeussermann) Automatic Theodolite for Saturn Alignment: This is in final design phase at Perkin Elmer Corporation. The feature includes: (a) An internal servo loop which drives the optical pickup to the return image, so that the momentary reflector angle (on the platform) can be read on an instrument; (b) A penta reflector on a carriage, perpendicular to the line-of-sight-changes caused by angular changes of the platform and its prism, so that acquisition is not lost; (c) A TV camera in the optical track with monitor at the blockhouse panel, so that both initial acquisition and perfect operation to the last minutes can be supervised visually and controlled remotely. ✓

Item 6: (Mrazek) Long-Lead Item for C-5 Procurement: Marshall's Propulsion & Vehicle Engineering Division would like to contract to Boeing about $4 million worth of development hardware. If this is done through P&C by single items, we will not be able to spend this money in FY 62. Means should be found to cover this single action with Boeing. This is a serious problem area.

Item 7: (Mrazek) Dummy Payload for SA-5 and SA-6: MSFC's Manufacturing Engineering Division estimated cost for adapter section at $170,000 (tooling $86,000 and materials $84,000). All assembly done in-house; parts, subassemblies, and tooling supplied by vendors. Assembly will begin August 1, 1962, with delivery of SA-DYN adapter October 1, 1962. Flight launch schedule will be maintained. This is tight. ✓

Replace by Kuers Note #4 B

Mac — let's take this out of package for Holmes and solve it internally. I don't think we need Holmes' help for this. Please take up with Harry G. and Bill Davis B

Attention: According to Kuers' Notes 4/9/62 item #5 issue has been settled! B

NOTES 4-9-62 GORMAN B 4/9

1. BOEING CONTRACT - Discussed with Lange and Dannenberg the advisability of having an early meeting with Boeing to examine again the Boeing ground rules and to obtain an up-to-date reading of Boeing's plans for personnel to support the Marshall effort with respect to the S-1C. Believe Lange should exert a strong voice in the Boeing operation, particularly in their planning for Marshall and Michoud. Such a meeting is tentatively scheduled for Tuesday of this week. → I agree completely. B

2. GOVERNOR OF LOUISIANA - You are off the hook, at least for the time being, with respect to a luncheon meeting planned for April 16. I have been asked by the Governor to attend the meeting in your stead. ✓

3. MSFC OFFICE SPACE - You asked for a "brochure" on the Center's office space and a plan to reflect our problems for the present and the future. This will be ready by Friday of this week. You had previously mentioned your desire to take this up with Seamans and others who may be interested in this problem. ✓

4. HAEUSSERMANN'S NOTES - With respect to your question on Haeussermann's notes last week (copy attached) regarding the procurement peak load anticipated during the close-out phase of the fiscal year, Ted Hardeman has been given the responsibility for scheduling the work that must be done prior to June 1 in order to obligate our funds for FY 62. When Ted has completed his analysis, we will get together with the Divisions, including Astrionics, to provide whatever assistance we can to meet the deadline. ✓

5. CENTAUR CONTRACTS - Bill Davis has assigned six people to clean up the Centaur Contracts. Unfortunately, because of the Centaur launch date, I have not been able to talk to Hans Hueter on this problem. Bill assures me that we will have this matter cleaned up within a short time and will be prepared to carry on (on a continuing basis) with procurement types located in the project office at GD/A and in Hueter's office here in Huntsville. ✓

NOTES 4/9/62 CONSTAN

B 4/9

1. RENOVATION AT MICHOUD

a. Office Building:

(1) Painting floors and installing light fixtures in executive suite.

(2) Testing the chilled water lines from equipment room to fan house.

b. Engineering Building:

(1) Repairing electrical circuits and lighting fixtures and constructing partitions in center portion (Mason-Rust area). Approximately 95% complete.

(2) Painting walls and installing floor tile in center portion. Approximately 50% completed on second floor.

(3) Reinstalling plumbing fixtures. Approximately 85% complete.

c. Boiler Plant:

Installing four (4) purge units. Four more awaiting delivery.

d. General:

Reworking main substation. ✓

2. SPACE RESEARCH PROJECTS

Arranged for Research Projects office personnel to make various presentations to universities in New Orleans on participating in space research projects sanctioned by MSFC. ✓

3. ARCHITECT-ENGINEER DESIGN SERVICES

A conference was held with M-P&C to determine appropriate steps required to initiate criteria and AE support plant modification. M-SAT will make available $320,847.00 of R&D money, (maximum, subject to negotiation) to support this effort. ✓

4. S-I-C

M-ME Division and The Boeing Company have agreed on final assembly area. Included in the agreement a decision to use one final (vertical) assembly station and three (3) tank assembly stations was mutually agreed upon. ✓

5. PRESIDENT'S COMMITTEE ON EQUAL EMPLOYMENT OPPORTUNITIES

Members of the President's Committee on Equal Employment Opportunities met in New Orleans on April 5, 1962 with representatives of Boeing, Chrysler, Mason-Rust and Marshall to discuss the President's program. The purpose of the meeting was to become acquainted with those individuals at Michoud Operations who participate in the employment program. There were no problems or any expected in this area at Michoud. ✓

NOTES 4-9-62 DEBUS B 4/9

1. Major Items of Impact on LOD/MSFC: I briefed you Saturday on the items concerned with:

   a. Jack Young's visit to LOD to go over organizational responsibilities and his report to me on areas of disagreements (as well as agreements) which he developed at Houston MSC.

   b. "Overflight" agreement between Webb-MacNamara and the other implications of this agreement.

   c. The position papers I prepared for Holmes as a result of announcement (b).

   d. The Davis letter to Schriever on his plan of attack as well as the letter to Sollahub concerning transfer of land to the Air Force.

   e. The Teague Sub Committee status. ✓

2. Siting of Titan III: On Sunday we had a three hour meeting with the AFMTC people. Purpose: Listen to their justifications for land. We agreed that new land was required before firm siting of the NOVA, SATURN and TITAN III could be accomplished. ✓

3. Project High Water: No problems in the trajectory and range safety area. The question was raised by Range Safety Division what to do if track and/or plot should be lost after cutoff and prior to reaching the desired destruct altitude of 105 km. Answer obtained from Stuhlinger's office: destroy at time after launch when nominally 105 km altitude would be reached. Additional information received: if, due to some malfunction, altitude of 105 km will not be reached but range safety destruct is not required, the Project High Water experiment is still of interest if the altitude exceeds 80 km. ✓

4. Digitation of Telemetry Data (Test Run): A magnetic tape from the SA-1 flight was digitized and the measurements were processed and printed out by the computer. (205). ✓

5. SA-2: Checkout of SA-2 this week consisted primarily of Vehicle Systems Overall Tests. All operations have been normal and checkout continues on schedule. Fuel and Lox Load Tests are primary for next week, followed by the final overall test and Simulated Flight Test the next week. ✓

6. Outcome of Siegler Study: On Saturday, after you departed, I had a status report by the Siegler people on their contract to establish impact probability curves to assist us in siting pads in the new area. The preliminary estimate indicates that it will be a valuable tool for the future. A final report will be available by Wednesday noon, together with certain conclusions which can be drawn from the study. I will forward a copy to you as soon as available or plan to brief you personally later on in the week when I will be in Huntsville. ✓

Kurt (What happened to the AF (or Kubel) claim for the deed of the new land in view of Tiger Teague's apparent opposition to any such schemes? B

NOTES - GEISSLER - 4-62-9 ✓! B 4/9

1. SA-5 BUFFET PROBLEMS: M-AERO personnel McNair, Holderer, and Reed with M. A. Silveira of MSC visited NAA and Ames Center April 5 and 6 to discuss this problem area. NAA people were extremely cooperative and in fact had written a letter to MSC and MSFC inviting personnel to discuss the tower stiffness problem on April 6. ~~(We had not received this letter before we left.)~~ It was apparent that our difficulties in obtaining information up to now from NAA were a result of poor communication. NAA personnel were working to increase the tower stiffness but had not been informed the reason for the requirement, were not informed on Q-Ball utilization, and had never been requested (on the working level) to study either an interim SA-5 shroud or an operational shroud. Nothing has been initiated as a solution for the buffet problem if it exists. (Information was obtained informally that MSC and NAA officials had met last week to consider revising the Block II mission schedule because the present mission schedule could not be held due to various slippages; i.e., the MIT guidance system will not be available on SA-7 or SA-8 and the re-entry missions would slip to SA-9 and SA-10.)* ✓

The Ames meeting established tentative schedules and guide lines for the flutter programs. Ames, MSC, and MSFC were in general agreement as to the goals of the program. Mr. Erickson has been given a complete go-ahead by his superiors to include this work in his research program. MSFC has agreed to supply elastic vehicle characteristics to Ames in about one week and Ames will then proceed with hardware. ✓

*This information is for internal use only.

NOTES 4-9-62 GORMAN B 4/9

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NOTES 4-9-62 GRAU

B 4/9

1. QUALITY ASSURANCE DIVISION REPRESENTATIVE AT ASTRIONICS DIVISION: Mr. Winston S. Caldwell has been temporarily assigned as the Quality Assurance Division representative in the Astrionics Division for review of procurement requests, quality assurance provisions and to assist design personnel on quality assurance matters. ✓

2. SLOAN FELLOWSHIP: Mr. Spencer E. Smith, Chief of our Quality Engineering Branch, has been accepted for study at MIT under the Sloan Fellowship. He will leave us for one year starting in June. ✓

NOTES - HAEUSSERMANN, 4/9/62 B 4/9

1. STATUS REPORT - ELECTRICAL SYSTEM DESIGN INTEGRATION WORKING GROUP, Chairman: H. Fichtner. Two-day meeting was held 3/20 and 21 at DAC and NAA. (a) The meeting at DAC covered the C-1 electrical design program. A number of problem areas were discussed including: (1) EBW Pulse Checker Design, (2) Status of S-IV Countdown Automation, (3) Expediting Documentation Flow, (4) Grounding Scheme, (5) Vehicle Environmental Control System - Preflight for Complex 37B. (b) The meeting at NAA was the first C-5 meeting and it primarily covered a wide area of electrical design parameters and ground rules. (c) Chrysler Space Division and The Boeing Company representatives participated unofficially in both meetings. ✓

2. STATUS REPORT - SATURN/APOLLO SPACE VEHICLE ELECTRICAL SYSTEMS PANEL, Chairman: H. Fichtner. The first meeting of the panel was held 3/27. This meeting outlined the organizational structure of the technical coordination panels which have been established to assure the successful integration of booster, spacecraft, and launch facilities for joint undertakings by MSC and MSFC. Several presentations were made to outline the C-1 and C-5 vehicle systems layouts and to define the SA-5 capsule. Other topics discussed included grounding techniques and RFI standards. ✓

3. STATUS REPORT - MSFC AUTOMATION BOARD FOR SPACE VEHICLE CHECKOUT AND LAUNCH OPERATION SYSTEMS, Chairman: H. Fichtner. Meeting was held on 3/29 and 30. Presentations were given for the benefit of General Electric's Systems Integration and Checkout Personnel. The GE people were here with Mr. Sloan. Briefings in the concept checkout areas were made by representatives from Q, P&VE, LOD, and ASTR divisions. On 4/5 the Automation Board gave a presentation to MSFC stage contractors covering checkout concept. ✓

*✓ 4. AUTOMATIC THEODOLITE FOR SATURN ALIGNMENT. This is in final design phase at Perkin Elmer Corporation. The features include: (a) An internal servo loop which drives the optical pickup to the return image, so that the momentary reflector angle (on the platform) can be read on an instrument. (b) A penta reflector on a carriage, perpendicular to the line of sight, which compensates for vehicle sway and for line-of-sight-changes caused by angular changes of the platform and its prism, so that acquisition is not lost. (c) A T. V. camera in the optical track with monitor at the blockhouse panel, so that both initial acquisition and perfect operation to the last minutes can be supervised visually and controlled remotely. ✓

9cm

5. MODEL OF SUPPORTING BASE FOR SATURN DYNAMIC TESTS. Scale model for conducting evaluation tests has been completed. Studies are being conducted by Hosenthien's branch. It has rolling bellows, ball bearing guides, and eight sets of plano-spherical air bearings to support the model. The rolling bellows can be air or fluid operated. We would like to see this. Please arrange B

6. FLIGHT SIMULATION FACILITY: C&F Project No. 62-155 is scheduled to go out for bids 4/30. ✓

NOTES 4/9/62 Helmburg B 4/9

1. LIQUID HYDROGEN FACILITY:

The second successful RL10 engine LH_2 cold flow and turbine spin-up was accomplished at LH_2 Facility, Friday, 4/6/62. Turbine speed reached 33,000 r.p.m. Preliminary results indicate satisfactory performance of the engine and facility. ✓

2. S-I-3:

On schedule, with first short firing tomorrow, 4/10/62. Difficulties experienced with discrete level probe system in LOX center tank required entering tank to repair electrical shorts. Item had not been tried out in SA-T. ✓

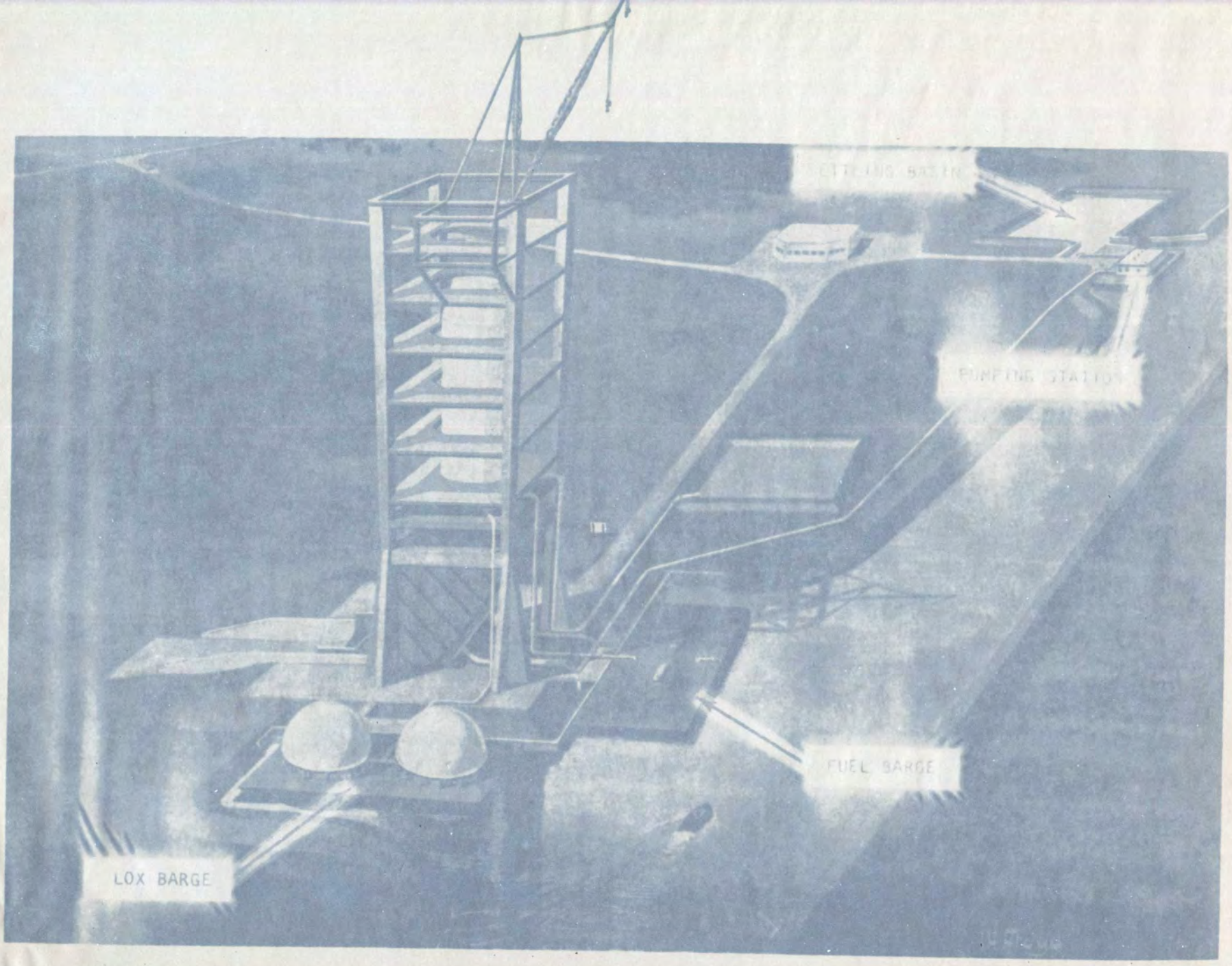
3. MARINE EQUIPMENT:

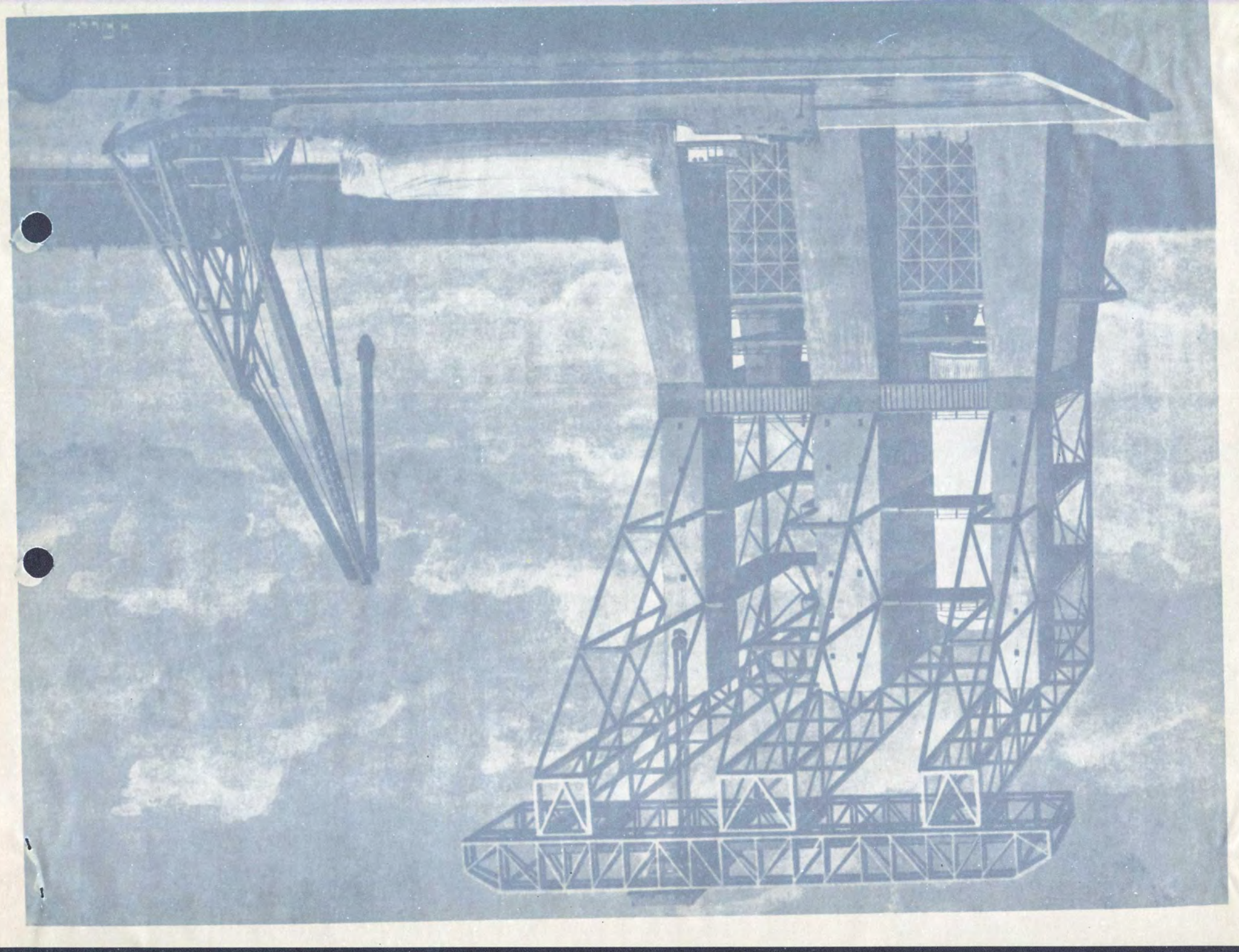
A meeting was held at U. S. Army Headquarters, Washington, D. C., regarding MSFC marine equipment acquisition. Our requirements and the identifying numbers of the U.S. Army vessels we want were presented to the Transportation Corps. U. S. Army Headquarters advised they will present a confirmation of a "hold" inventory to Test Division, 4/12/62. Approximately 60 vessels are involved. ✓

4. MISSISSIPPI TEST FACILITIES:

Envisioned approaches of C-5 stand arrangements at MTF are shown on enclosed photographs. ✓ Very interesting. B

ATTACHMENT:
2 photogtaphs of proposed MTF stands.


LOX BARGE
FUEL BARGE



B 4/9

NOTES 4-9-62 HOELZER

1. AEROBALLISTICS ANALOG COMPUTER: High speed analog computing facility in Bldg. 4484 has been completed. Checkout of computer is to begin April 9. Order for auxiliary tape recording equipment has been delayed by lack of funds, but is now in Purchasing and Contracting Office. ✓

2. DECENTRALIZED ANALOG COMPUTERS: Expansion of decentralized analog computing facilities in Aeroballistics Division and installation of such facilities in Propulsion & Vehicle Engineering Division has been delayed for several months by lack of funds. ← H.H. available in FY63? B

3. FLIGHT SIMULATION FACILITY: The contract for extending the Flight Simulation Laboratory is out for bids. ✓

4. AUTOMATIC CYCLE COUNTER: New cycle counting system, developed by Beckman Systems (Contract NAS8-1516) has been received, checked out, and is ready for acceptance. System is capable of counting output of ten stations simultaneously, but is presently equipped for single channel. Intentions are to equip the system in FY 63 for its full capabilities. ✓

5. GE 225 COMPUTER: The second GE 225 computer, originally scheduled for HIC Building, has been installed in Aeroballistics due to the unavailability of site downtown. ✓

6. LOD-ADPS COMPUTERS: Specifications have been sent out for replacement of the Burroughs 205 and the IBM 1401 at the Cape. ✓

CONFIDENTIAL

NOTES 4-9-62 HUETER

B 4/9

1. CENTAUR:

a. F-1: The scheduled launch for F-1 on 4-6-62 was delayed because of a defective LH_2 vent valve. The spare which was determined earlier to be on hand was not available. A replacement valve was obtained from San Diego and the flight was rescheduled for 4-7-62. On the morning of 4-7-62 the flight was again delayed because of high wind velocity conditions and computer difficulties. The F-1 flight has been rescheduled for 4-11-62. An earlier flight is not possible because of other launches scheduled at AMR on Monday and Tuesday. ✓

b. F-2: The F-2 vehicle has completed preliminary acceptance and went to Sycamore S-4 Tuesday night, Apr 3, to begin preparation for propulsion testing. The facility itself is still not ready for the testing due to shortages and modifications not accomplished. The first cold flow test is now scheduled for Apr 18. ✓

c. Standard Atlas "D" Booster: A letter is being prepared for your signature to Dr. Newell, recommending that the proposed standard Atlas "D" space booster be phased into NASA programs as early as practical. The more obvious and significant advantages to be expected are increased performance (165K engine) and the inherent reliability and economic gains achieved through standardization. The biggest problem appears to be phasing in the standard booster and the associated facility modifications with minimum interruption to the NASA flight schedules. The Air Force estimates the first standard booster will be ready for launch 18 months after go ahead - early 1964. ✓

H.H. I've read the (excellent) "J" appraisal study and concur with your recommendation B

2. AGENA:

a. Gemini: Pad availability for Atlas-Agena is a current problem being actively pursued by NASA Hq, Office of Space Sciences and Office of Manned Space Flight. The original plan to use Pad 14 is hampered by the Mercury Program continuing through 4th Quarter CY 1963.

A study by LMSC indicates the Agena has the capability to control the Agena/Spacecraft docked vehicle. MSC was pleased with this report and in all probability will use this capability.

MSC is taking a hard look at the program including budget. As a result, the target vehicle will be reduced from 11 to 8 (3 spares eliminated). It is evident also that MSC management has taken a critical look at "unnecessary" development items on the Agena. For example, fuel cells for long orbit life and increased secondary propulsion system to "several hundred" feet per second are no longer serious considerations.

MSC will brief MSFC on Gemini Program at a time mutually convenient. Dr. von Braun should establish preferred date.

On Mar 30 a TWX was sent from SSD to LMSC authorizing work to begin on the Gemini Program. This TWX also recognizes and confirms earlier agreement to allow limited work to begin on Mar 19. ✓

b. Thorad: Authorization was given to LMSC and DAC on Apr 4 to initiate work on a study of three Thorad configurations to be considered as possible boosters for the Nimbus Operational Meteorological satellite. Cost of the study has been estimated to be $175,000. ✓

c. Ranger 4: Range checkout of Ranger 4 flight hardware is progressing satisfactorily. Atlas FACT was completed on Monday, J-FACT completed on Wednesday (Apr 4). Sufficient spares are now available at AMR. A problem with Agena ullage rockets was corrected by discarding potentially unsafe rockets and replacing with rockets from another mix of propellants. ✓

H.H. Let's do it after the MSC visit here on April 16. How about 1 May or 2 May? Here, or in Houston? B

CONFIDENTIAL

NOTES 4-9-62 Koelle B 4/9

1. NOVA

There will be a Bidder's Conference Tuesday, April 10, at 10:00 a.m. at the Twickenham to answer some fifty questions. Your attendance is not required. It appears that we will get bids on the study from General Dynamics, Douglas, Lockheed, Martin and North American Aviation.

Following Canright's suggestion, we are trying to get Air Force representation on the NOVA Study Source Selection Board. ✓

2. C-5 DIRECT CAPABILITY

I will organize a small effort to result in a precise determination of the "margin of error" for this mode. I consider this a fifth working group within Dr. Geissler's overall effort. I suggest that this be placed on the agenda of the next board meeting as a 5-minute discussion item. ✓

3. CONTRACTOR SELECTION ON 10-TON REUSABLE CARRIER STUDY CONTRACT

One of our new studies is a follow-on to the C-1 for the early 1970's. We have specified 10 men plus a crew of two or 10 tons of useful cargo as performance capability. We have also specified low maximum accelerations (preferably 2 g's) and reuse of both stages. ✓ o.k., but this would rule out a solid booster which may be competitive! B

The evaluation committee under chairmanship of Dieter Fellenz, P&VE, has selected NAA and Lockheed (California Division) proposals as the best. They are by far the best and really outstanding proposals. It is a pleasure to read them. Other bidders were Douglas, General Dynamics/Astronautics, Bell, United Aircraft, STL, Ryan, Marquardt and Goodyear.

If you approve our selection, we will proceed with negotiations.

→ Yes. B 4/9

H.H.K.

→ Suggest to also discuss it with Shea, April 10. (Will call you)

B 4/9

NOTES 4-9-62 KUERS B4H9

1. SA-5: The first 70" Lox Tank has been received from Chance Vought approximately on schedule. ✓

2. Shrouded Version of the Dummy Apollo for SA-5: Since the first unit of this structure is needed for dynamic testing in October of this year, we must build this shrouded version in-house. Procurement of components and tooling requires the availability of 0.170 million immediately. Five people from Chrysler, Michoud, are also required to assist in fabrication and assembly. Is this the 154/105 inch adapter between SAT C1 guidance slice in Sep. Instrum. compartment?)

3. Republic Contract: Labor problems at Republic have resulted in a strike, however, no immediate problems are anticipated in their meeting delivery schedules. They are utilizing supervisory personnel to manufacture Saturn parts and are also sub-contracting our work where possible. The Republic Contract for components and tooling totals 3.5 million. Close attention is being given this area by Technical Liaison personnel temporarily stationed at the contractors plant. ✓

* for Holmes Notes

4. Boeing Facility Plans: Boeing originally proposed an additional 120,000 square feet of high bay area at Michoud. There is no justification for this proposal because many of the operations planned in this facility could be performed adequately in the main Michoud building. In four meetings we reduced, with their concurrence, the requirement to approximately 50,000 square feet, of which only 20,000 square feet would be 200 feet in height. The remaining area would be 100 feet high. By comparison, our area has 10,000 square feet, is 140 feet in height, and will cost 1.4 million. ✓ (new MSFC high bay)

5. Boeing Contract: This division is very much in need of a service contract with Boeing for fabrication of long lead time items and tooling. In spite of many discussions with Mr. Urlaub, Dr. Constan, Mr. Davis, and Mr. Gorman, it seems that is is not possible to come to an agreement on the type of contract to be negotiated. We have waited for three weeks already when time is of major importance. Money is available for funding such a contract. (Note: I received information while these notes were being typed that this contract is now approved and negotiations will begin immediately.) ✓

NOTES 4-9-62, Lange B4/8

1. C-1 - Our major effort is concerned with the overall project planning in relation to the accomplishments of this year, FY-63 funding and CSD activation. We hope we can propose a program, meeting the mission objectives and remaining within the FY-63 funding.

a. S-I SA-5 - The SA-5 fuel containers will not be reworked, because a 6 weeks direct slippage would occur. Angle of attack will have to be held below 5°, meaning either alpha control or wind limitations. SA-6 fuel containers will be strengthened.

b. S-IV Stage - DAC was directed to replace the LOX tank in the all-systems vehicle. Schedule effect is ~~as~~ follows:

(1). All systems stage delivery to SACTO slips 14 weeks. By eliminating tankage tests, hot-firing may be delayed only 4 weeks to January 63.

(2). Dynamic test stage delivery to MSFC will be delayed up to 6 weeks. Actual delay plus effect on squeezed dynamic test program and wet test program is being analyzed.

(3). SA-5 slippage will probably result from this action, however, we feel that no SA-5 launch schedule re-evaluation should take place until summer 1962.

c. SA-5 Payload:-

a. A JUPITER nose cone will be prepared as APOLLO backup for SA-5 and SA-6. SSO will provide $180,000 to meet time schedule (also for SA-D-5).

b. Regarding Ames, Erickson's tests were of a "first ~~crack~~ crack" nature. At this time, the results are inconclusive with an inadequate model. An MSC man has met our people at Ames ~~Friday~~ last Friday. The meeting you discussed with Piland will be postponed until (a) Ames tests will be more conclusive, (b) a written analysis of the total dynamic problem will be available from our side (estimate: end of April).

c. MSC appears to prepare a mission change on SA 5-10, cancelling the reentry mission for SA-7 and 8, because of delivery problems at NAA. This may affect the SA-~~6~~ 5 and 6 APOLLO payloads, too. (Unofficial information)

2. C-5:

a. Letter to HQ's is being prepared to focus the misalignment between the real C-5 schedule capabilities and the already obsolete schedules of 12-18-61 Summary Development Plan. Submission to HQ's is expected by 4-13-62.

b. S-IC - An overall policy review will be held with Boeing on 4-10-62 to analyze guidelines to and performance of the contractor.

c. S-II - The "UA" status continues to exist in the facilities go-ahead. In accordance with the Rosen TWX of "deliberate" action, an informal exchange of updated program requirements is being furnished to brief San Diego Navy personnel. Briefing will be at WOO on 4-10-62 with participation of MSFC. A separate all week working session between MSFC and S&ID will review the entire S&ID prepared facility criteria for MSFC approval.

d. S-IVB - The DAC firm proposal and program documents were received and distributed for study and evaluation. MSFC coordinated position is expected by May.

3. Answers to Dr. v. Braun comments on Notes 4-2-62, Lange & Constan are attached.

NOTES 4-2-62, Lange

B 4/4

1. C-1:

S-IV: In order to overcome the manufacturing difficulties of the common bulkhead as reported earlier the following rescheduling is under study: SA-6 will become the wet test vehicle, for fill and drain test, at the Cape, the all system and dynamics vehicle will be interchanged; therefore, all S-IV schedules can be met provided there is a 4 month interval between SA-5 and SA-6 launch as presently scheduled.

The interstage honey-comb will be left in the all systems vehicle and further steps are under study and will be reported with the next notes.

2. C-5: Major problem is still a resolution of the official schedule agreement with HQs and official notification so contractors can plan accordingly.

S-IC: The status of Boeing build up on S-IC as of March 29 is as follows: 710 total people are-assigned to the program; 526 are located in Huntsville, of which 142 are located in the MSFC divisions.

S-II: Facilities action has been placed in the "Urgent Action" category by TWX MSFC to Headquarters.

MSFC has requested S&ID furnish copies of the subcontract proposals for the S-II hydraulic actuators. The purpose is to make an independent evaluation for comparison with the S&ID proposed selection. Mutual agreement is expected between MSFC and S&ID before final committing to development.

S-IVB: A statement of work for continued S-IVB studies and preliminary design effort for the period Apr 1 thru July 31, 62 has been coordinated with the appropriate MSFC personnel and was forwarded to WOO for contract implementation with DAC. This action was necessary to maintain continuity in the S-IVB effort since this work was to terminate 3-30-62 unless extended. In view of the recent optimization studies leading toward larger diameter and increased propellant loading, the present extention can be redirected to incorporate new findings as early as they are firmly established.

The contract proposal documents with cost estimate for S-IVB as a basic escape stage for C-5 (200K propellant loading and 220 inch diameter) are expected to be received from DAC 4-2-62.

O.L. Please send me copy B

3. Apollo: First weight breakdown of Apollo command module, service module, and escape system and first sketches of configuration (lacking detail) have arrived from North American Aviation, Inc.

The procurement of a proper Apollo type payload for SA-5 is under review and will be submitted as a separate report by mid-week.

4. Funding: The SATURN Program has FY 63 C of F requirements that are not in the President's Budget, i.e., S-II acceptance stands (MTF), S-IVB test facilities, etc. An exercise must be started to bring these items into focus by an overall look at the FY 63 C of F budget. Some reprogramming between NOVA and SATURN appears necessary to obtain a solution.

Suggest we do this after selection of "mode" B

→ O.L.

I don't think Hq. will be ready to sign off on a final overall schedule before questions such as "mode" & "true moon" or "CI vs CIB" - "two-stages" have been resolved. What is wrong with checking with Hq. "better" for lack of a final master plan we couldn't give contractors "our own schedules for program guidance?" "It's all we can accomplish, anyhow." B

NOTES 4/2/62 CONSTAN R

S-1 EFFORT

The in-house review of Chrysler Space Division document "Saturn S-1 Stage and C-1 ehicle Program Plans, 1961-1966" is continuing in coordination with M-SAT. ✓

answered by Finnstrom

→ Oswald Lange

Request briefing. B ✓

MSFC ROUTING SLIP

	CODE	NAME	INIT.	☐ ACTION	☐ INFORMATION
1	M-DIR	Dr. von Braun			
2					
3					
4					

REMARKS

Refer to Constan's Notes of 4-2-62, regarding the Chrysler SATURN S-I Stage and C-1 vehicle program plans. It is our intent to brief you on the Chrysler Program in relation to the total C-1 project on Thursday, April 12, 1962, at 3 P.M.

Bob Lindstrom

CODE	NAME	DATE

MSFC - Form 183 (Rev. February 1961)

NOTES 4-9-62, Maus

B 4/9

1. STEERING GROUP FOR THIRD STAGE FOR SATURN C-1: Chairman John Sloop, (formerly of OSS) held meeting in OSS April 5 to discuss third stage for Saturn C-1 and/or C-1B; with representatives from OSS, OMSF, JPL, and MSFC. Mrs. Buwalda, senior representative from JPL expressed preference for the C-1B three stage vehicle for carrying out the lunar and planetary missions, because: (1) the payload capability of C-1 is marginal for planetary missions, and (2) the early availability advantage of C-1 is offset by unavailability of payloads.

Mr. Cortright of OSS indicated that currently OMSF favors C-5 vehicles for unmanned lunar probes over either C-1 or C-1B. Mr. Nicks of OSS indicates that the planetary missions alone cannot support development costs for third stage for C-1 or C-1B. Mr. Nicks also stated that his office will consider the committee's recommendations, and C-5 lunar and planetary capabilities from the mission standpoint, will coordinate with OMSF and make a recommendation to Dr. Newell. (Note: Our Jay Foster is not a member of this committee, but sat in on this meeting.)

2. HEADQUARTERS DIRECTIVE ON SCHEDULING: At the April 3 and 4 meeting in OMSF, the draft of the OMSF Directive on Scheduling and Funding was reviewed by Mr. Muhly of MSC, Messrs. Clearman and Pearson of LOC, and Jay Foster and Bud Abbott of MSFC. This directive will require a bi-weekly status report and a complete revision of consolidated schedules and funding plans quarterly. Headquarters expects that schedules from the three Centers will not be completely coordinated, and that OMSF will mesh and feed back necessary revisions to the Centers. At the meeting, Headquarters was noncommittal on how much depth (the levels) would be required on schedules and reporting.

Funding requirements shown in Center submissions will reflect current year planned and actual obligations, by month and by programs, and subsequent requirements by year, with C of F and R&D totals only.

3. MSC REQUEST FOR SPACE AT MISSISSIPPI TEST FACILITY: The Central Planning Office has been contacted by Mr. McCollough, Assistant Chief for Planning, Apollo Program, of MSC, Houston, inquiring if MSFC plans for use of MTF will enable MSC to locate a hazardous testing area there. He stated that their operation would require a buffer zone of 4 miles to the nearest inhabited area, would require exclusive MSC control and use, and continuous and permanent operation. The buffer zone would be necessary due to possible releases of large quantities of unburned propellants (Nitrogen Tetroxide and UDMH). They are also considering other sites across the country; he stated that they had a very tight time schedule and require activation by July 1963. At our request, Tom Edwards in Test Division contacted Mr. McCollough and advised that their time requirement cannot be met by MTF, and also offered advice and assistance if MSC desires. Edwards disagrees that such a large buffer zone is required. This matter was left on the basis that they would continue to consider all sites and contact us again if they had further interest in the MTF.

NOTES 4-9-62 MCCALL

B 4/9

(In reply to your note to me on Constan's 4-2-62 NOTES)

Every company (including MSFC) spending government money wants their own toy. Computers are fun so everyone wants one. A large portion of the work is usually done so inefficiently that it is wasted (again this remark applies to MSFC in-house as well as to companies).

The only valid arguments these companies have is that certain financial data is proprietary and should not be done on a computer belonging to some other company. Even this argument is weak, however, because the IBM Service Bureau, among others, does a nationwide business of keeping books on computers for other companies.

There are a lot of invalid arguments proposed by Boeing and Chrysler such as scheduling, etc. Hoelzer does not want the headache of arguing with them so his attitude is, "Give them what they want". Constan has agreed with Comp Division to take on these headaches himself and is proceeding in that direction.

Enc: Constan's 4-2- Notes

Mac

I think I agree with your convincing arguments. But don't you think we should invite Boeing and CC to give us their reasons in writing and invalidate (or disprove) them point by point, so as to really and permanently "bury the issue"?

B 4/9

George Constan:

Please give B some info as to how you are resolving this problem.

Hold this page closely as it is somewhat sensitive.

4-10

CONFIDENTIAL RD

B 4/9

NOTES MRAZEK 4-9-62

1. KIWI REACTOR: Bottom plate for next KIWI reactor to be tested cracked during assembly at Los Alamos. Test of B2 will be delayed from June until late Fall. The B4 reactor scheduled to be tested with LH_2 in August. ✓

2. RIFT PRESENTATIONS: Bidders will make technical presentation 10:30-12:00 a.m. in Director's Conference Room Monday through Wednesday, this week. ✓

3. C-5 ITEMS:

a. PROCEDURES FOR WEIGHT CONTROL AND MASS CHARACTERISTICS: Propulsion & Vehicle Engineering Division personnel have discussed procedures with Boeing. ✓

b. STATUS OF BOEING PERSONNEL: Boeing personnel working in Division 4-5-62: Advanced Flight Systems Branch--6; Vehicle Engineering Branch--44; Structures Branch--45; Propulsion & Mechanics Branch--25; and Engineering Materials Branch--7. Total onboard is 127. 125 additional personnel expected in April. ✓

c. INSTRUMENTATION SLICE--S-IVB: Representatives of Research Projects, Astrionics, and Propulsion & Vehicle Engineering Divisions reached general agreements on instrumentation slice in 4-6-62 meeting. Final decisions will be made in a second meeting scheduled 4-19-62. ✓

d. LOX TANKER: Structural investigation started on LOX tanker for orbital operations. ✓

e. LONG-LEAD ITEM FOR C-5 PROCUREMENT: This Division would like to contract to Boeing about $4 million worth of development hardware. If we should do it through P&C by single items, we will not be able to spend this money in FY 62. Means should be found to cover this single action with Boeing. This is a serious problem area. W.M. Looks like this has been settled. See last sentence Kuers Notes 4-9-62, item #5 B

4. SA-5 ITEMS:

a. DUMMY PAYLOAD FOR SA-5 AND SA-6: Manufacturing Division estimated cost for adapter section at $170,000 (tooling $86,000 and materials $84,000). All assembly done in-house; parts, subassemblies, and tooling supplied by vendors. Assembly will begin 8-1-62 with delivery of SA-DYN adapter 10-1-62. Flight launch schedule will be maintained. This is tight. Design of Q-Ball and nose cone will be as on SA-4; design of adapter section should be complete by 6-6-62; long-lead time items are due out of design by 4-30-62. Design cost is 2500 manhours with Brown Engineering. The preparation of design documentation was further progressed, as the alternate approach using S-V dummy. Overall cost with two new S-V dummies would have been higher. We went ahead with the first described solution.

b. FLUTTER MODEL FIN: Contract has been negotiated with Republic Aviation to design, build, and test a flutter model of SA-5 fin. ✓

5. ENGINEERING SUPPORT AND ENGINEERING PERSONNEL AT CHRYSLER: Indications are that with the present FY 63 budget allocations to this Division, only HALF of the planned Chrysler support for the C-1 can be financed. We cannot fill the gap with Civil Service people. This will result in a slippage of at least three months of all C-1 schedules for this FY.

Oswald Lange

If that's the case, you seem to have a major problem here. Suggestions? B

2 attachments: (as requested in notes 4-2-62)
1. Movie Camera Project Explanation
2. Applicable Documents List (example)

CONFIDENTIAL RD

PROGRESS OF MOVIE CAMERA PROJECT

4-6-62

B 4/9

Two prototype capsules have been received from Cook Electric Co. Astrionics Division has one for testing and Propulsion & Vehicle Engineering Division has the other. This Division has pressure-tested capsule at 15 psi; results 2 psi leakage in 30 minutes. P&C is negotiating contract for capsules. General Dynamics/Astronautics will fly several of these capsules mounted in our ejection chute in their Atlas missiles in coming months. Information will be exchanged between MSFC (drop tests) and GD/A (flight tests).

Capsule has been proved statically aerodynamically stable through wind tunnel tests at AEDC and will be dynamically tested by Aeroballistics at MSFC. Simulated aerodynamic heat tests will be performed by Propulsion and Vehicle Eng. Division.

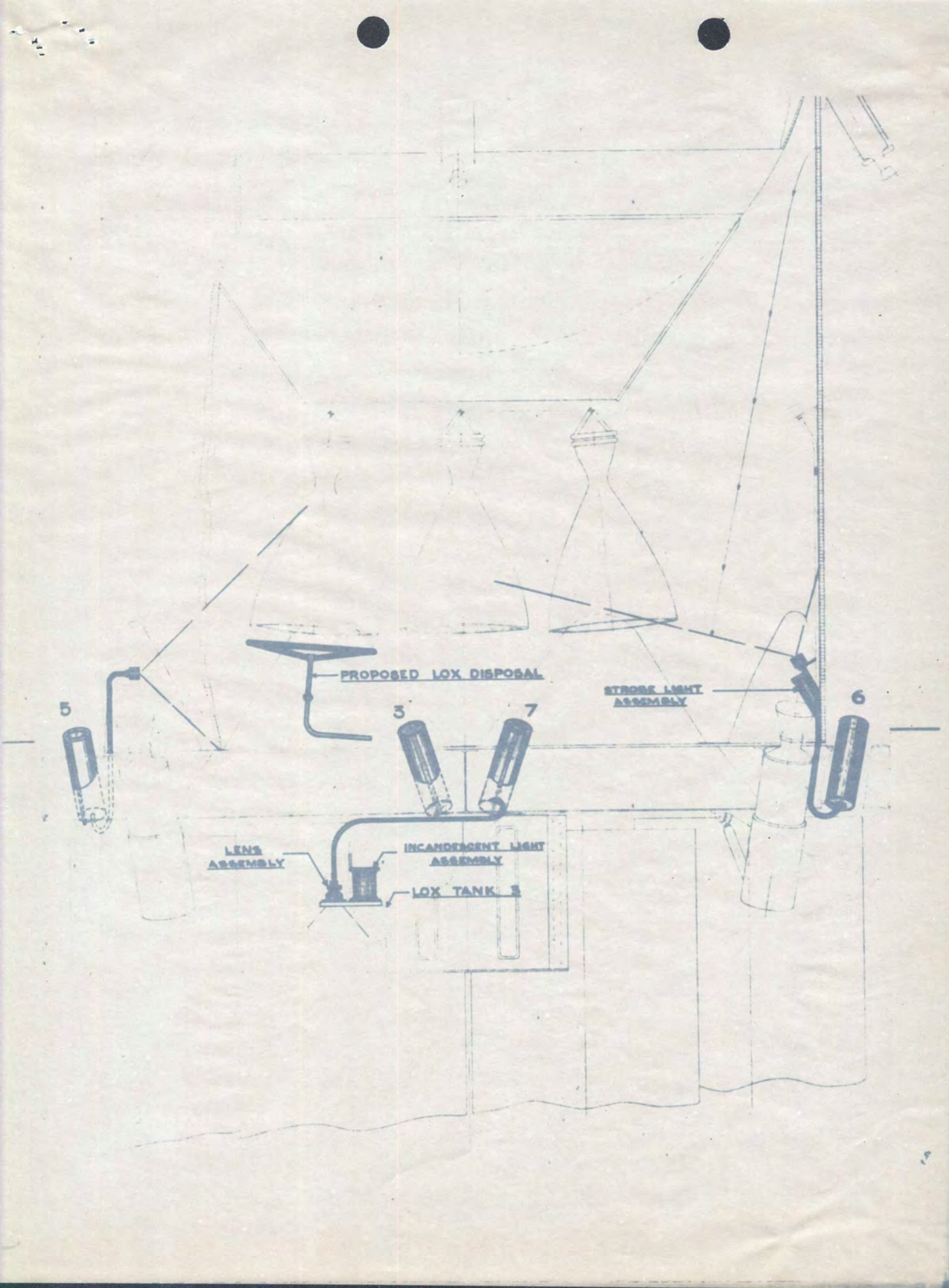
All 35 ejection tests performed on ejection mechanism for SA-5 capsule were successful. Shear pin is .132 diameter 6061-T6 aluminum alloy which shears at 900 lb; ejection pressure is 300 psi; ejection velocity is 28 ft/sec and average acceleration is 22 g's.

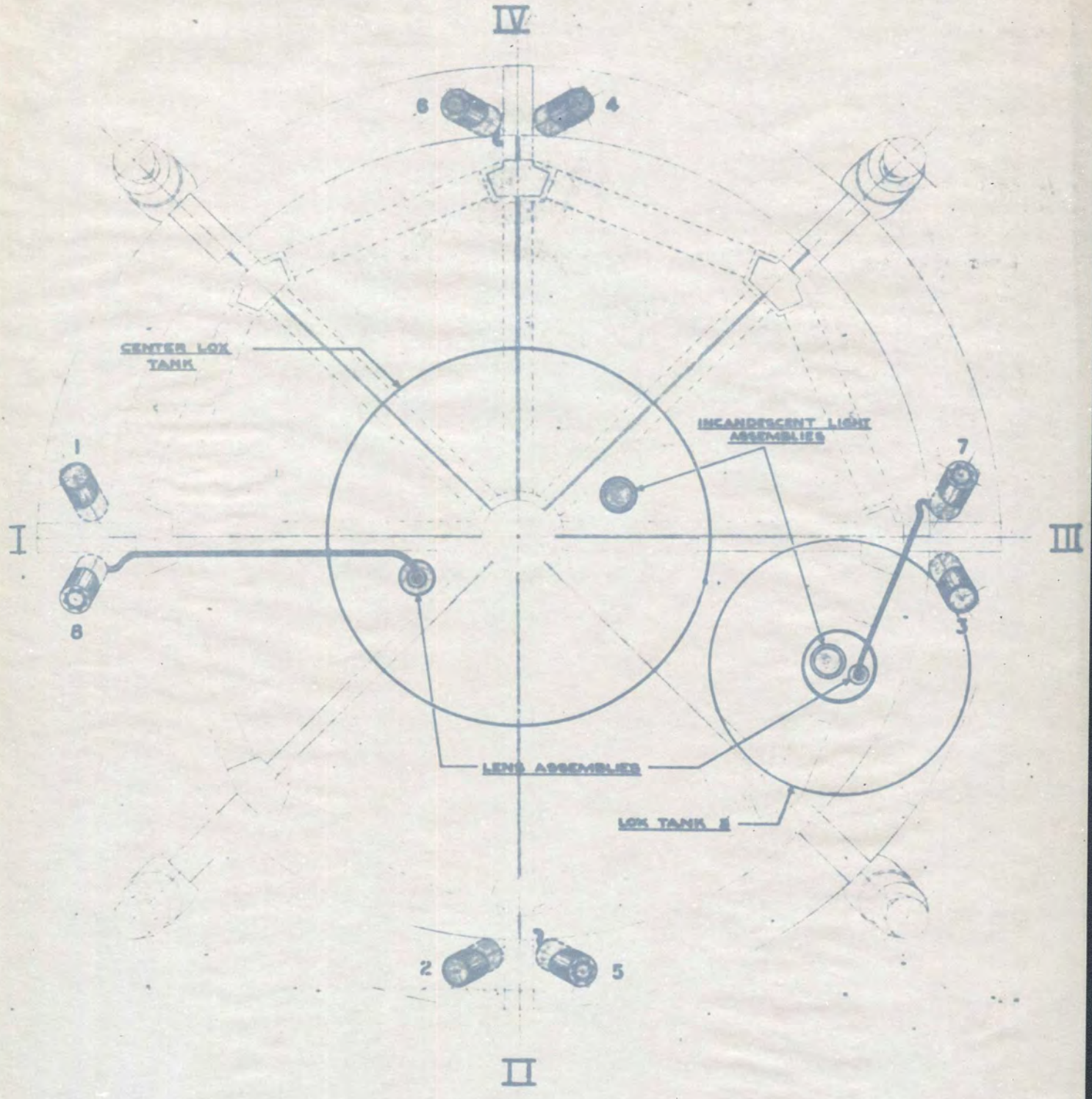
An "I" beam segment with the two ejection capsules mounted will be used for vibration tests of mounting arrangement and handling. Vibration tests with 10g input have been made successfully.

Window assemblies for center LOX tank and one outer LOX tank were tested hydrostatically and with LN_2 -- no leaks occurred when proper torque was used. A bread-board setup of heater-purge system for defogging the LOX windows and lenses is being finished. This setup has purge system completed and LOX window installed in small cryogenic tanks. Test will be run in near future. Sketches of the system with more detailed information are attached.

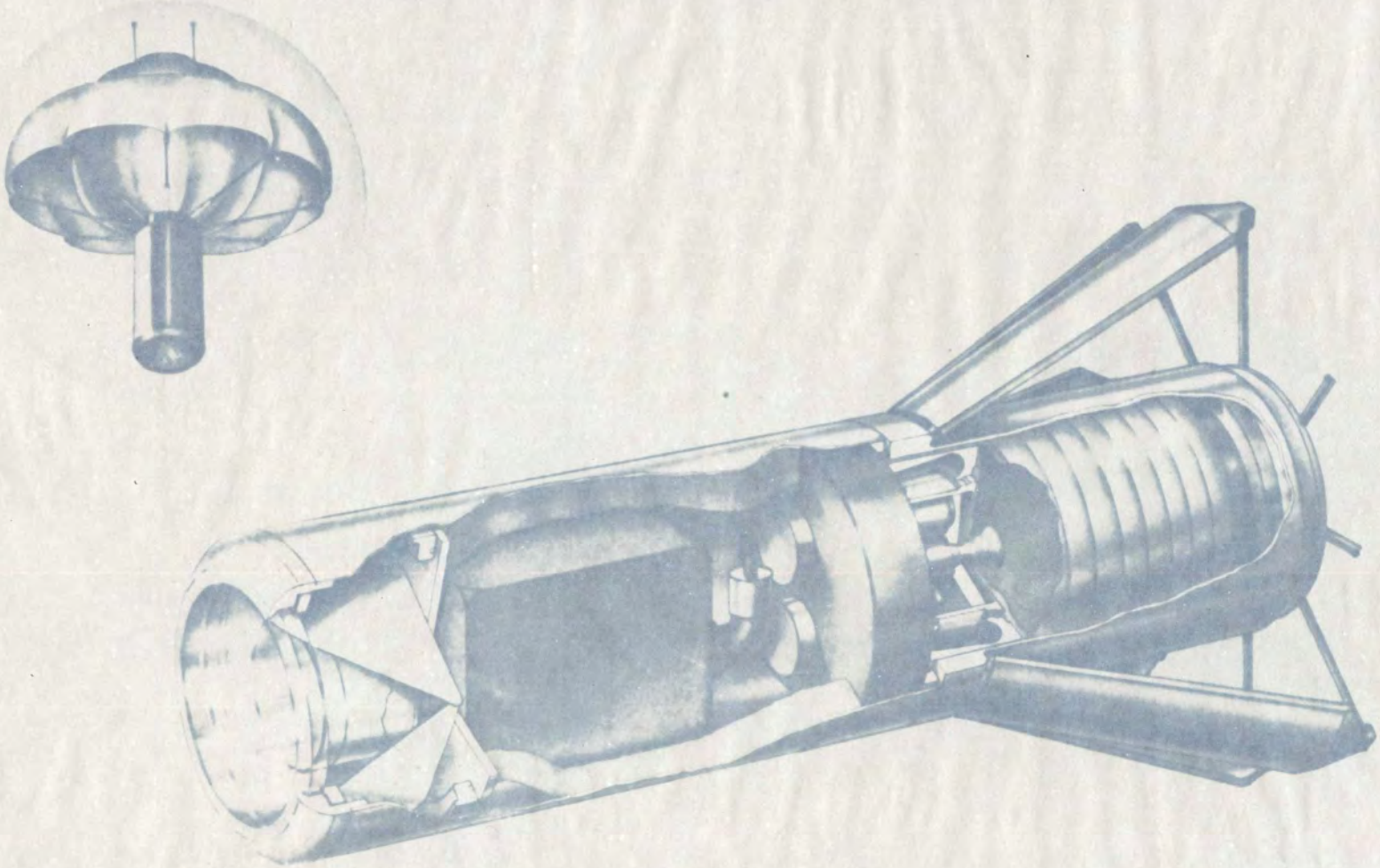
The description of the flap retainer (notes 4-2-62) pertained to ground handling and personnel safety only. If an erroneous inflation during handling should occur, personnel will be protected by the flap retainer.

ATTACHMENT 1


PROPOSED LOX DISPOSAL
STROBE LIGHT ASSEMBLY
5
3
7
6
LENS ASSEMBLY
INCANDESCENT LIGHT ASSEMBLY
LOX TANK S

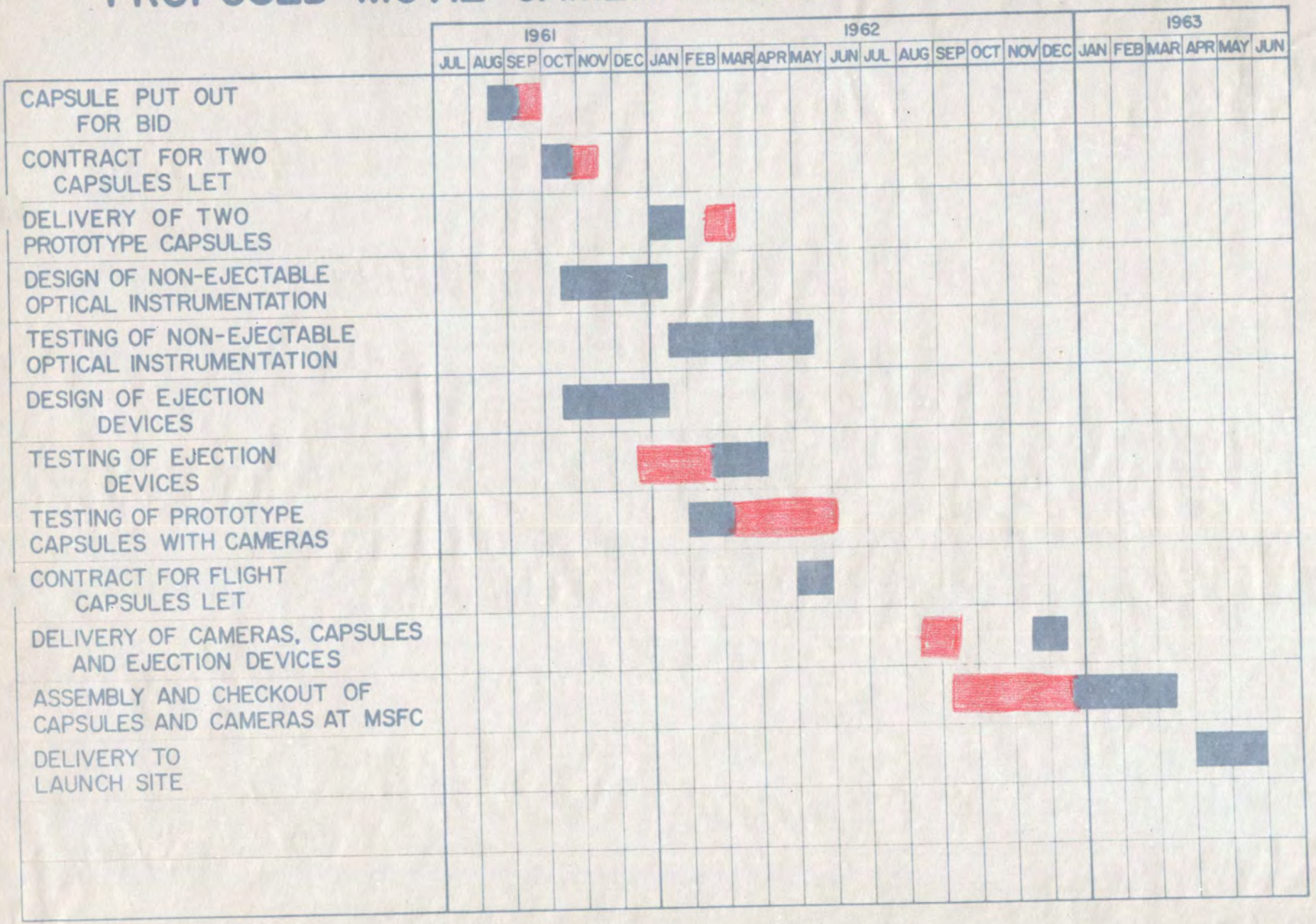

IV
6
4
CENTER LOK TANK
INCANDESCENT LIGHT ASSEMBLIES
1
7
I
III
8
3
LENS ASSEMBLIES
LOK TANK II
2
5
II

RECOVERABLE CAMERA CAPSULE



M-MS-G 65-1-61
AUG. 22, 1961

PROPOSED MOVIE CAMERA SCHEDULE FOR SA-5



DEVELOPMENT PLAN OF CAPSULE

1. Stability
   a. Theoretical Calculations
      (1) At MSFC by (AERO) ✓
      (2) By Contractor ✓
   b. Wind Tunnel Tests
      (1) At MSFC by (AERO) ✓
2. Aerodynamic Heating
   a. Calculation of Heating
      (1) At MSFC by (P&VE) ✓
      (2) By Contractor ✓
   b. Heat Test of Capsule
      (1) At MSFC by (P&VE)
3. Structural Integrity
   a. Pressure Testing
      (1) By Contractor
      (2) At MSFC by (P&VE)
   b. Negative Pressure Testing (Vacuum)
      (1) At MSFC by (P&VE) (TEST)

4. Vibration Testing

   a. Camera

      (1) At MSFC by (G&C) ✓

   b. Complete Capsule

      (1) At MSFC by (P&VE)

5. Systems Testing

   a. Camera Tests (radio interference, etc.)

      (1) At MSFC by (G&C) ✓

   b. Recovery Package Tests

      (1) By Contractor ✓

      (2) At MSFC by (P&VE)

   c. Radio-light Beacon Tests

      (1) By Contractor

      (2) At MSFC by (G&C)

   d. Drop Tests (Not required if flight test possible) ?

      (1) At MSFC by (P&VE-TSR)

6. Flight Test on SA-4

   a. One camera capsule covering retro-rockets

      (1) At MSFC by (P&VE) and (G&C)

NOTES 4-9-62 Rudolph B 4/10

1. Shea Visit:

As you know Shea will be here tomorrow, Tuesday, April 10.

He will spend most of the time with me and my people, but also wants to talk to Geissler and Haeussermann re recent assignments toward mode selection.

I have notified both of them. ✓

2. Trip to Chance-Vought, Dallas:

I'll join you and your staff, and Shea on that trip. ✓

3. Space Electronics & Telemetry Symposium:

In my last notes I mentioned this subject, with my plea to you to be the banquet speaker on October 3, 1962 at the Fontainebleau in Miami.

Since you did not write any annotations, I still have the hope that you might be able to make it.

I realize, of course, that I am asking you for a great favor and that it is still a bit long til October - but couldn't you tell Bonnie to mark that day on your calendar?

AM

I have marked it down on my calendar, but I can accept it only if you settle for a replacement speaker in case I have to cancel, even at short notice! B

NOTES 4-9-62 Stuhlinger

B 4/10

1. SUPPORTING RESEARCH: We have not yet received any "feedback" from OART concerning the FY-1963 MSFC Supporting Research Program, which was submitted to OART on March 15. The program totalled 25.109 M, excluding the submission proposed by the Future Projects Office.

The Procurement and Contracts Office has announced that they will be unable to process any FY-1962 Procurement Requests which are submitted to M-P&C later than May 1. We have requested the other divisions to submit their remaining FY-1962 LVT requirements to RPD before April 23 in order that we will have sufficient time to process the requests before the May 1 deadline. The current status of the FY-1962 LVT Program is indicated in the table below. We have also asked the other divisions to submit additional high-priority requirements, not presently covered in the program, to consume the surplus funding that has become available.

STATUS OF LAUNCH VEHICLE TECHNOLOGY PROGRAM

Division	Authorized	Committed	Balance
Astr.	2,198,000	1,915,639	282,361
Aero.	1,009,000	1,005,317	3,683
Comp.	181,384	181,384	0
LOD	180,000	180,000	0
ME	1,003,623	1,002,327	1,296
QUAL	142,100	124,439	17,661
P&VE	1,921,091	1,843,686	77,405
RPD	1,109,142*	822,775	286,367*
Test	370,660	348,815	21,845
Totals	8,115,000	7,424,382	690,618

*Includes "Kitty" of $253,793, available for use by all divisions

2. OFFICE OF APPLICATIONS: Mr. Thompson visited the Office of Applications last week. The OA is preparing a paper for distribution which will state the mission for the Industrial Applications Program, the role of Headquarters and the role of the field centers. This paper will also serve as a guide for the use of contractor support.

3. NEW ORLEANS VISIT: At the suggestion of Dr. Constan, Michoud Operations, a visit to the universities in the New Orleans - Baton Rouge area was made. Participating in the trip were 3 members of RPD (Dr. Lundquist, Mr. Miles, Mr. Heller) and Mr. Chauncey Huth and Mr. J. Dowdy (Personnel Training Branch). Universities visited were: Louisiana State University (Baton Rouge) Tulane University, Loyola University, Southern Louisiana University, Louisiana State University in New Orleans. The main topics of discussion were educational requirements of employees of NASA, Chrysler and Boeing in New Orleans and participation of their universities in NASA's Supporting Research Program. Tulane University has been in contact with Mr. Webb and is preparing a request to the Administrator for a substantial research and education program with NASA funding (12 million up). MSFC's role in the New Orleans area is yet to be clarified. RPD will work with Mr. Huth and Mr. Dowdy on this problem.

NOTES WEIDNER 4-9-62 B 4/12

1. SATURN S-IV: Douglas has completed cold-flow portion of Battleship Program. Two chilldown and ten turbine spin tests with LH_2-LN_2 were performed; satisfactory acceleration achieved with 25 seconds cooldown time and vehicle tank pressures. No ignition tests have been performed yet.

2. ENGINE PROJECTS:

a. F-1: R&D testing of engine turbopump resumed. #017 turbopump successfully subjected to LN_2 1500K run. #013 with heavy instrumentation has begun series with water and RP-1. F-1 engine number 005 shut down by rough combustion during attempt 3-29-62. Cause attributed to fuel being allowed to enter injector ahead of water during transition. This is first 1500K engine run several times successfully; one test was 96 seconds.

b. J-2: Hydrogen shortage somewhat alleviated and testing on a limited basis resumed. Three engine runs attempted; first cut during transition due to temperature spike in gas generator. Spike attributed to gaseous hydrogen in pump from a delay of 40 seconds before engine start after chilldown. Second run-one second into mainstage; test met objectives. Third was cut after two seconds due to a facility malfunction. Three gas generator ignition tests with a modified injector at low LOX inlet pressure successfully completed with ignition occurring within 50 milliseconds. Testing on this assembly continuing.

c. M-1: M-1 engine program letter contract documents for R&D and facilities were handcarried to NASA Headquarters on 4-5-62 to assist in securing fund obligation authority for the program. Aerojet has now spent or committed $928,000 for R&D; $1,483,000 for special test equipment; and $610,115 for facilities without contract coverage. They are spending at rate of $600,000 per month and Aerojet Program Manager is holding $2.0 million purchase requests pending receipt of letter contracts.

d. H-1: A LOX pump explosion occurred at Canoga Park during green run of a Mark III production turbopump. Complete investigation being conducted by Rocketdyne to determine cause. Initial results indicate number 2 bearing failed. Complete report will be issued when analysis is completed. Incident stresses soundness of green-run acceptance for new turbopumps. All engines for SA-5 will be delivered by 4-12-62. Cracking in exhaust hood bellows showed up recently in 188K testing. Introduction of full-length internal liner apparently promising. Problem needs more effort.

e. RL10: Modification 16 to contract NAS8-2690, which redefines terms, conditions, and scope of work of basic RL-10 program, became official 4-2-62. New E-6 vertical test stand has successfully completed check firing. RL10A-3 development is progressing satisfactorily.

April 16, 1962

NOTES 4-16-62 GORMAN B 4/22

1. F-1 ENGINE TEST STAND - The Mobile District Office, Corps of Engineers, has received the FY-62 funds for design and initial construction of the F-1 Engine Test Stand, West Area, and is preparing to initiate A-E negotiations. ✓

* Jam 2. MISSISSIPPI TEST FACILITY - The Real Estate Directive was issued to Mobile District Engineer on April 11, 1962, and first purchase of land at the Mississippi Test Facility was made the morning of April 12, 1962 (1.9 acres at $11,500, including house, garage, and workshop). ✓

3. MICHOUD DESIGN WORK - A-E contract with Vector Corporation (joint venture of two Louisiana firms) approved by NASA Headquarters on April 11 for Michoud design work. Work will commence promptly. ✓

4. PRESIDENT'S COMMITTEE ON EQUAL EMPLOYMENT - Conferences were attended in New Orleans at the Michoud plant involving the President's Committee on Equal Employment, and the contractors. Those present included John Fields, Executive Secretary of the Committee; Al Hodgson, NASA Headquarters; Paul Styles; MSFC; John Miraglia, George Constan, Keith Wible, Michoud; and representatives from Chrysler, Boeing, and Mason-Rust. Mr. Fields expressed himself as being delighted with the progress made in the fair employment program at Michoud. ✓

* Next minutes to Holmes!
B

This has already been included to Holmes (Constan Item)

NOTES 4/16/62 CONSTAN

B 4/18

1. RENOVATIONS AT MICHOUD
   a. Office Building:
      (1) Installing reflective ceiling in executive suite. Approximately 35% complete.
      (2) Poured base for cooling tower.
      (3) Installing chilled water lines. ✓
   b. Engineering Building:
      (1) Installing electrical circuits and lighting in west end.
      (2) Completed partitions in center portion (Mason-Rust area).
      (3) Completed floor tile from east end to column line 31, second floor. ✓
   c. General:
      (1) Reworking main substations.
      (2) Installed rebuilt diesel engine for pump number three (3) in Pump Station east of Boiler Plant. ✓

*2. FAA FACILITY — I (first person) Federal Aviation Agency

gem Mr. Constan escorted ~~Messrs.~~ Smith and Lowery of Chrysler and Harlan of Boeing to inspect the FAA facility at Slidel, La. Subsequently, a meeting was held and a tentative agreement reached that Chrysler would occupy this building. The target date for occupancy is on or about June 1, 1962. ✓

*3. COMPUTER FACILITIES

gem A decision was made to establish a single Central Computing facility at Michoud to furnish computation services to Michoud Operations and its contractors. This decision was reached based on the consideration that this was the best way to fulfill the need for computer and data processing equipment and facility requirements. Factors considered in reaching this decision included computer utilization and use factors, operating personnel needed, required availability dates, amounts of equipment saved by centralizing, and funding availability. A steering committee composed of representatives from Marshall, Mason-Rust, Boeing and Chrysler was established to plan the facility. (See enclosure 1.)

Both Boeing and Chrysler registered written objection to the Central facility concept mainly because of proprietary data such as payroll, personnel, management reports and certain scientific data over which corporate policy of both companies requires restrictive control. (See enclosure 2 for latest written objection.)

It was felt by the two stage contractors that Computer scheduling and priorities are problems peculiar to each program and must be subject to control of the responsible contractor and cannot be delegated to a second party.

At the Computation Division, MSFC, computers are operated by contractual arrangement with General Electric Corp. Scheduling and priorities are met satisfactorily as could well be the situation at Michoud.

Adequate safeguards can and will be established over proprietary information and schedules, priorities, etc. could be mutually agreed upon with an expert computer services firm operating a centralized computer facility.

In a meeting with Mr. Constan, Messrs. Smith and Stoner have agreed to support this Centralized Approach. ✓

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Distribution DATE March 23, 1962

FROM M-MICH

SUBJECT Establishment of Computer Facilities Michoud Operations

The attached letter was forwarded to the companies listed below:

The Boeing Company, Huntsville Office
Chrysler Space Division, Huntsville Office
Mason-Rust, Michoud Plant

G. N. Constan
G. N. Constan
Manager, Michoud Operations

Distribution

M-DEP-R&D	
M-DEP-ADM	
M-COMP-DIR	Mr. Hoelzer
M-COMP-DIR	Mr. Bradshaw
M-FEO	Mr. Lloyd
M-P&C-SM	Mr. Fletcher
M-SAT-DIR	Mr. Dannenberg
M-TEST-DIR	Mr. Heimburg
M-MICH	Mr. Bailey
	Mr. Nuber
	Mr. Abernethy
	Mr. Stevenson
	Mr. Smith

MSFC - Form 488 (August 1960)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

IN REPLY REFER TO

M-MICH

March 23, 1962

B

M/MICH/INFORMATION COPY Mr. Stamy

Subject: Establishment of Computer Facilities Michoud Operations

Gentlemen:

It is evident that MSFC and the various contractors to be located at the Michoud Facility will require quite extensive computational facilities. These requirements indicate that this computer facility should be available for use in the early fall of 1962.

It has been determined that the computer facilities will be centralized to provide service to the various groups concerned. It is evident that a cooperative effort among the groups concerned will be necessary to find solutions to problems which will arise from multiple use of such a centralized facility. With this in mind I am establishing a committee to be known as the "MICHOUD COMPUTER STEERING COMMITTEE". This committee is being formed to expedite the establishment of this computer facility. The steering committee will be composed as follows:

Organization	Number of People
MSFC - Michoud Operations	3
MSFC - Saturn Systems Office	1
MSFC - Computation Division	2
Boeing Company	2
Chrysler Corporation	2
Mason-Rust Company	2
MSFC - Facilities Engineering Office	1

This committee will establish the plan which will lead to the centralized computer facility and will include physical site, computer selection, communication links associated with the Central Computer

March 23, 1962

Facility and supporting functions such as EAM and key punching.

The first meeting of this committee will take place at the Michoud Plant Conference Room at 10:00 am, Tuesday, March 27, 1962.

Very truly yours,

G. N. Constan

G. N. Constan
Manager, Michoud Operations

ROCKWELL-STANDARD CORPORATION
Conneaut, Pennsylvania

5 April 1962

JOINT BOEING-CHRYSLER STATEMENT REGARDING CENTRAL COMPUTING FACILITY AND ITS PROPOSED OPERATION

B 4/18

It has been agreed by the representatives of Chrysler Corporation and representatives of the Boeing Company who are members of the Michoud Computer Steering Committee that the Boeing Company shall make a statement presenting the common position of the two Companies with respect to the Michoud Central Computer Facility.

The following items represent Management directives, requirements, objectives, and previously stated modes of future operation.

1. Corporate policy of each company has resulted in the following Management directives to the respective Committee Members:

   (a) Under no circumstances will employees of another company be permitted to transmit data, process data, operate computers which are processing data, or otherwise have access to data which may be considered of a proprietary nature. This includes but is not limited to the following:
   Financial data, payroll data, personnel data, Management reports, and certain scientific data and computer programs.

(b) Computer scheduling and priorities are problems peculiar to each program and must be subject to control of the responsible contractor in his own best Management judgement. It cannot be delegated to a second party.

These points are emphasized as being directives to the Chrysler and Boeing Committee Members by their respective Managements and are stated as firm positions.

2. It is recognized that the purpose of this Committee (by NASA directive) is to proceed with the establishment of a Central Computing facility to be operated by a single contractor. The objective of this course of action is to establish a capability which will satisfy the requirements of all concerned and also effect maximum economies in rental costs, construction costs, and space.

3. Establishment of a central computer facility is understood to be an interim arrangement and at the appropriate time would become decentralized in operation, if not by physical location.

Items one and two above are apparently mutually incompatible. The Management of the facility by an independent operator would prevent item 3 from being put into effect. Specifically, it would set a precedent and would be a source of profit to the operator and not readily relinquished. This would also negate much of the

contemplated economy of the central facility.

It is therefore desired to present a brief outline of a proposal which is mutually agreeable to Chrysler and Boeing. It is also believed that this course of action will satisfy the NASA directive which established this Committee.

Conditions on which the proposal is based:

1. EAM operations will be the responsibility of the individual contractors (with possible exceptions).
2. Chrysler computer requirements at Michoud are not immediately imperative.
3. Chrysler can satisfy most of their requirements by a Michoud punch card facility and utilization of their Detroit Computer Facility until some time in early 1963.
4. Boeing requirements at Michoud are necessary by August 1962, and cannot be delayed beyond October 1, 1962.
5. Mason-Rust requirements are negligible.
6. NASA requirements represent a small percentage of the total.

It is therefore proposed that Boeing establish and operate a central computer facility for the Michoud plant under the following general conditions:

1. Boeing will immediately negotiate rental agreements for such equipment necessary to meet immediate and short term requirements.
2. Boeing will staff and manage the operation and satisfy the requirements of all concerned as follows:
   (a) Time will be available on all computers as required within the stated assumptions.
   (b) Chrysler employees will operate the computer during the processing of any of their proprietary data.
   (c) Mason-Rust and NASA have not stated any proprietary requirements but adequate safeguards will be provided.
3. This mode of operation will continue until such time as Chrysler requirements require additional equipment. At this point (with NASA approval) the operational responsibility will be split between Chrysler and Boeing. Each will then be responsible for its own equipment and system.
4. After the operational separation, Boeing will continue to satisfy NASA and Mason-Rust requirements.

Explicit details of this operation will be subject to negotiation and approval.

Boeing is qualified and prepared to do this for the following reasons:

1. Current computing facilities in the Seattle Area include the following:

(a) Scientific:

4 IBM 7090 Computers	1 Univac 1103A
2 Rem Rand SS-80	8 IBM 1401
1 RCA 301	1 Tally Printer Platter
1 IBM 1620	

(b) Commercial:

2 IBM 7080	1 IBM 705
19 IBM 1401	2 IBM 1410

2. A majority of the management, operational, and programming staff is now available for transfer to Michoud.

O. E. DUNN
for The Boeing Company

Approved: F. M. VAN SICKLE
for the Chrysler Corp.

Makes sense
B 4/18

NOTES 4-16-62 DEBUS B 4/18

1. Real Estate Acquisition: MSFC has received allocation of $7 million for real estate acquisition. Work Order to LOD should arrive today. Government Order to Jacksonville will be processed immediately. (Reference to your question as to the Air Force claim to the deed for the new land) Holmes has advised me that NASA should retain title to the new land acquisition and the Corps of Engineers of Jacksonville was advised accordingly. However, Rosen later advised that Mr. Webb may not be able to go along with this but that we should continue our attempts to retain title to the land. Incidentally, General Davis had forwarded a letter to the C of E, Jacksonville, instructing Col. Sollahub to turn over the title of the new property to the Air Force. Col. Sollahub, however, forwarded the request to me. We advised them to continue turning the title over to us. ✓ Sounds like war drums! B

2. Banana River Causeway: $150,000 for design of the Banana River Causeway and road link to Orsino and accompanying communication facilities have been authorized by NASA Hq. Design work begins immediately. ✓

3. MSFC Task Force for Division of Resources: Massey and King arrived at the Cape April 16. The main purpose at this time is to determine personnel distribution between LOC and LVOD. ✓

4. Titan III: I understand that Rubel has directed that a full study be made of the Titan III launch philosophy and facilities. DOD has established a committee; asked for NASA participation. I assigned Bidgood. Study is to last for two weeks. I think they will be much surprised when the total estimated cost is presented from the committee. ✓

5. Industrial Relations Office: Mr. Joseph W. Bailey has been selected to replace Mr. John Miraglia who transfers to the Michoud Plant. ✓

6. Centaur F-1 Launch Attempt on April 11: Scrubbed because of Atlas pressure being below the redline value on ground pressurization Sequence III and internal. The cause for this problem not yet determined; however, erroneous indication by ground instrumentation is suspected. ✓

7. Visit of UN Delegates: I devoted a major portion of Tuesday, April 10th, to the visit of delegates from the United Nations. ✓

8. Visit of His Imperial Majesty Mohammed Reza Shah Pahlavi, the Shahanshah of Iran: Saturday evening and Sunday were spent entertaining His Imperial Majesty and touring him through NASA facilities at the Cape. He was very much impressed with the activities involved, and the State Department commented before they departed that they were pleased with the plans and execution. The Acting Commander AMR was deeply disturbed by the protocol arrangements furnished to LOD by the State Department. The Acting Commander insisted on changing of plans shortly before arrival of party and threatened to "bump" the personal representative of the President of the U. S. Rough going and continued future problem. ✓

K.D. ✓ Here we go! (It surprises me that no such problems exist between AOMC and MSFC. We swap out VIP's freely. How come?) B

NOTES - GEISSLER - 4-16-62 B 4/22

1. SA-5 CONFIGURATION & FLUTTER PROBLEM: NAA people from Downey delivered the latest structural data (April 12, 1962) on the boilerplate capsule for SA-5. This is the last input required for control studies in M-AERO and M-ASTR to finally determine the abort tower stiffness requirements.

2. S-IC BASE THERMAL ENVIRONMENT: Estimates of thermal environment about the base of S-IC have been made. A test program to support our estimates and to investigate questionable areas has been initiated. A contract has been let and model design has been started for one phase of the program. The estimates and an outline of the experimental program was presented to Mr. Mrazek and P&VE April 11, 1962.

3. RECENT TECHNICAL REPORTS PUBLISHED BY FLIGHT EVALUATION BRANCH:

1. Stability and Visibility of Lunar Orbits by Kurtz
2. Observed Missile Response to Wind Turbulence by Lindberg and Weisler
3. Error Analysis of Propulsion System Parameter Evaluation for Saturn SA-1 by Fulmer

4. STATUS OF C-5 WIND TUNNEL PROGRAMS: Plans for C-5 Wind Tunnel programs at Langley Field are established. A tinker toy C-5 force model for static stability investigations is being designed and will be shipped to Langley Field for continuing use in the Unitary and 8-foot wind tunnels. The basic model will be built sufficiently flexible to accommodate major configuration changes, especially those concerning the payload. This model will be useful for other than MSC payloads which Langley Field is planning to conduct; i.e., manned space stations, etc. Preliminary plans have also been made for on-pad wind load investigations and base heating tests. Currently, the C-5 F-1 nozzle hinge moment tests are under way in the 8-foot and Unitary wind tunnels.

5. C-5 LAUNCH COMPLEX: A working agreement between M-AERO and M-TEST has been reached concerning model studies for the C-5 launch complex. Cold air studies will precede hot model studies with cold air tests to commence May 15, 1962. The configurations determined from cold jet tests will be investigated by Test Division using scale F-1 hot engines. The final report which Launch Operations will use for design will be prepared by Test Division and will carry concurrence by M-AERO.

NOTES 4-16-62 GORMAN B 4/22

1. F-1 ENGINE TEST STAND - The Mobile District Office, Corps of Engineers, has received the FY-62 funds for design and initial construction of the F-1 Engine Test Stand, West Area, and is preparing to initiate A-E negotiations. ✓

* jam 2. MISSISSIPPI TEST FACILITY - The Real Estate Directive was issued to Mobile District Engineer on April 11, 1962, and first purchase of land at the Mississippi Test Facility was made the morning of April 12, 1962 (1.9 acres at $11,500, including house, garage, and workshop). ✓

3. MICHOUD DESIGN WORK - A-E contract with Vector Corporation (joint venture of two Louisiana firms) approved by NASA Headquarters on April 11 for Michoud design work. Work will commence promptly. ✓

* 4. PRESIDENT'S COMMITTEE ON EQUAL EMPLOYMENT - Conferences were attended in New Orleans at the Michoud plant involving the President's Committee on Equal Employment, and the contractors. Those present included John Fields, Executive Secretary of the Committee; Al Hodgson, NASA Headquarters; Paul Styles; MSFC; John Miraglia, George Constan, Keith Wible, Michoud; and representatives from Chrysler, Boeing, and Mason-Rust. Mr. Fields expressed himself as being delighted with the progress made in the fair employment program at Michoud. ✓

Next minutes to Holmes!
B

This has already been included to Holmes (Constan item)

NOTES 4-16-62 GRAU

B 4/22

1. VISIT TO LEWIS RESEARCH CENTER: Upon request by the Office of Reliability and Quality Assurance in NASA Headquarters, Mr. S. E. Smith and myself visited the Lewis Research Center, to confer with Lewis and Washington personnel in regard to application of the NPC 200 series of documents to contracts. The sincere effort of the Lewis people to apply and interpret the documents is commendable. We believe this meeting was very helpful for the Lewis personnel and we promised them further support in the interpretation and implementation of the documents.

2. ABILITIES INC.'S INTEREST IN MSFC METHODS: While in New York on other business, Mr. Wittmann was invited to visit Abilities, Inc., New York City. Mr. Henry Viscardi, Jr., President of Abilities Incorporated, had met with President Kennedy a few days earlier in the interest of training disabled people, and discussed nation-wide training of disabled people with Mr. Wittmann. Mr. Viscardi expressed considerable interest in visiting MSFC and adopting school methods applied in the MSFC School for Reliable Electrical Connections, of which he was aware due to the fact that we had trained two instructors for a school of Abilities, Inc., Clearwater, Florida in Fall 1961.

3. TRAINING AND ORIENTATION EFFORT: The Saturn Quarterly Report reveals that the Quality Assurance Division has trained and oriented during the past quarter 275 personnel in the various areas of our activities. Five hundred copies of the book on "Reliable Electrical Connections" were distributed; three copies of the film "Above and Beyond" (which deals with the importance of superior workmanship) were on constant loan and four masters of the film were furnished to contractors.

4. CENTAUR INSPECTION PROGRAM: We have received a very comprehensive plan of staffing from the Air Force at General Dynamics/Astronautics to accomplish an inspection program on the Centaur. Requirements will be in the vicinity of 40 personnel. The largest difficulties will probably be in obtaining Air Force approval of spaces and in locating the proper people for hiring.

5. SYSTEMS CHECKOUT AND PREFLIGHT TESTING WORKING GROUP:

a. The Systems Checkout and Preflight Testing Working Group met on April 9th and 10th with DAC regarding checkout and static firing. Detailed information from DAC was not available on the post-static testing where a weakness appears to exist. A followup discussion is scheduled for May 1st and 2nd.

b. A preliminary meeting with DAC on the S-IVB Automation Plan was held on April 13th, with followup scheduled for April 18th and 19th.

c. Comments on the S-II Automation Plan were given to NAA through M-SAT.

6. PRESSURE CELL BLDG. 4705-6: Pressure cell, laboratories and offices, with the exception of the Engine Modification Test Room, have been accepted for occupancy. The necessary move of personnel and test equipment is under way.

NOTES - HAEUSSERMANN, 4/16/62 B 4/22

1. S-IC STAGE EFFORT: Planning - Boeing is asked to produce and we are asked to comment on and later approve documents and specifications which are unreasonably premature. Prime examples are the request for model specifications for the S-IC stage and GSE by mid-May when, in fact, a definite design has not yet been selected in sufficient detail to generate a proper document. The problem is compounded by the fact that some of the requested documents will be included as contract documents, and, therefore, will be binding. We foresee areas where mandatory engineering changes will require major modifications to the contract - similar to our S-IV experience, which should by all means be avoided. The situation is not the fault of Boeing, but has come about due to the lack of revised planning. The current effort to delay the issuance of the definitive contract by six months has our wholehearted support - twelve months is even more desirable. In the meantime, revision of S-IC planning, incorporating a sound, practical approach is urgently needed. Manning - This effort is still lagging, but Boeing indicated during meeting on 4/13 that the requirements (including in-process revisions based on our interpretation of the program) will be fulfilled by mid-May. In certain areas there are difficulties in obtaining qualified Boeing personnel.

We have submitted to M-SAT our FY-63 Boeing in-house personnel requirements. ✓

2. POWER SUPPLY FOR USE WITH STROBE LIGHT SYSTEM FOR SA-5 CAMERAS: Preliminary design of a 2800 volt constant current power supply has been completed. Techniques in the design of this power supply were derived from those developed for the 1-kw arc engine under the SERT Program. ✓

3. STATUS REPORT - MSFC AUTOMATION BOARD FOR SPACE VEHICLE CHECKOUT AND LAUNCH OPERATION SYSTEMS - Chairman: H. Fichtner. Board met on 4/10 to review the Apollo Systems Integration Scope of Work for the GE contract. Comments reflecting the opinions of the board members have been submitted to your office for transmittal to Mr. Sloan. ✓

4. COMMENTS REGARDING VISIT OF MR. BUCKLEY, 4/5: In a discussion between Hoberg, Newby, and others after Buckley's visit, the following points were developed: There were no objections to any of the subjects presented to or discussed with Mr. Buckley and his people; establishment of a contact point in Hoberg's Branch seems to be advisable; MSFC's participation in discussions scheduled between LOC and Buckley's office is required; the attitude of Holmes' offices toward acceptance of funding from Buckley's office is an open item and requires the attention of M-DIR. Go ahead unless called down ?? JCan 4-16 → Yes! B ✓

5. AIR BEARING AIR SUPPLY SYSTEMS FEASIBILITY STUDIES: Two types of systems are being studied (bulk storage and recirculating) and indications are that the following weight penalities will be imposed for extended missions (10 days or longer). (a) For a 10 day, 240 hour mission, the system weight for each type supply system is approximately 0.5 lbs. per hour. (b) The bulk storage system's weight will increase at the rate of 0.43 lb/hr and the recirculating systems weight will increase at the rate of 0.40 lb/hr for each hour in excess of 240. ✓

6. PERSONNEL AT THE CAPE: A total of 25 employees are scheduled to report to the Cape beginning 4/17. Twenty-three of this group will be supporting prelaunch activities of SA-2. One individual will be participating in the Centaur inertial guidance systems activities and one will be attending a Procurement Management Seminar sponsored by NASA Headquarters. ✓

NOTES 4/16/62 - Heimburg B 4/22

1. CHILL-DOWN TEST:

The first LOX chill-down at simulated altitude was accomplished on the Pratt & Whitney RL-10 engine. The LOX was successfully gassified by injection of GN_2 in the nozzle. Prior tests had used LN_2 in place of LOX. ✓

2. MODEL TEST:

* jam The 1/20-scale model of SA-5 (Block II), with high performance engines, was completed, installed, and given its first test. It is being used in conducting the last phase of testing of the VLF-37 model deflector development. ✓

3. S-I-3 ACCEPTANCE FIRING STATUS:

K.H. Please keep me posted on this issue B

Unusually high composite vibration levels were measured on some of the engine gearcases during a short duration firing made on April 10, 1962. These measurements seem to have the same basic characteristics as noted previously on an engine in SA-T. Upon removal of the SA-T engine, it was determined that the LOX pump No. 1 bearing was in fact damaged. With this experience as background, the worst engine, from S-I-3 (position No. 2) was removed and fired on the Power Plant Test Stand, Saturday, April 14, 1962, and verified. More details will be known by tomorrow. ✓

4. CONTRACTOR FACILITIES:

Representatives of Test Division are attending meetings on the West Coast to review criteria for the S-II stage test facilities, as well as facility plans for the M-1 Engine. A 2-day meeting will be held at the test site in Nevada to come up with C of F requirements for FY 1964, (engine as well as stage facilities), and to discuss joint points of interest in the area of RIFT facilities. ✓

B 4/22

NOTES 4-16-62 HOELZER

1. DECENTRALIZED ANALOG COMPUTERS: It appears that capital equipment funds will not be available during FY'63. Even though these items can be leased, direct procurement is considered to be wiser. Lease funds will be available in FY'63. See Attachment 1.

Late NOTES will be rejected next time. JCM 4-16

NOTES 4-16-62 Koelle

1. ADVANCED LUNAR TRANSPORTATION SYSTEMS

B 4/22

The subject of one of our studies now beginning is "Advanced Lunar Transportation Systems." These systems are for the time period after APOLLO. Two promising systems will be studied in detail: (a) expendable system, this uses the SATURN C-5 and the RIFT stage as a third stage, which provides propulsion including braking into lunar orbit. A H_2/O_2 chemical stage takes care of the remainder; (b) reusable system, this envisions the introduction of the nuclear ferry vehicle between the two orbits and a chemical shuttle between lunar orbit and lunar surface. We have received nine (9) proposals of which seven (7) were acceptable. The choice was not easy because of the great number of good proposals.

* gan

The evaluation panel, under the chairmanship of Cary Rutland (FPO), recommends the selection of Lockheed MSD and Vought Astronautics. Martin, NAA, and Northrop were close behind these two. A detailed evaluation report is being prepared. The contracts will be about $150,000 each and will run over six months. Do you agree with our choice? → Yes B

2. DIRECT LUNAR MODE WITH C-5

A seven-page memorandum, with background information and a list of problem areas to be investigated, was distributed to the Divisions today. I am planning to have most of the data available in about six weeks. You will hear about the progress through these Notes. ✓

3. GROWTH POTENTIAL FOR ALL APOLLO MODES

We have initiated an effort to give us an indication of the growth potential of each mode for the lunar base build-up. We have established certain ground rules, which are based on reasonable firing rates, consistent with present facility planning. A three-page summary of our guidelines and calculation model is available. A memo on this subject is being prepared and will be distributed to the Divisions for information. This is primarily an effort within the Future Projects Office. ✓

NOTES 4-16-62 HUETER B 4/22

1. CENTAUR:

a. F-1 Launch: The F-1 launch, attempted and scrubbed on Apr 11, is now scheduled for launch on Apr 20. The difficulty which determined the need for scrubbing the launch was a low pressure condition in the Atlas LOX tank, which was attributed to poor pressure regulator performance. A second condition which was marginal but which would not have prevented the flight was high ground gust winds. Additional discrepancies which occurred during the countdown are now being investigated with validation tests occurring up to Wednesday. The CRT will be run on Wednesday with evaluation occurring Wednesday and Wednesday night. ✓

b. Centaur Program: Meetings were held at MSFC with GD/A and Office, Space Sciences personnel on Apr 9 and 10 for the purpose of defining a Centaur Development Program which will comply with requirements established by a Mar 12 TWX from Dr. Newell. During these meetings, a firm bulkhead development program was established. Other areas, such as propulsion test program, guidance program, schedules and cost, were discussed, but without final resolution. GD/A is now scheduled to come to MSFC on Apr 18 with proposals in these areas and, if accepted, this program will be included in a Centaur Preliminary Development Plan to be submitted to OSS during the week of Apr 23. Further FY 62 Centaur funding is being withheld pending receipt of this PDP. ✓

c. Centaur Guidance: The attached information is furnished in response to your comments to my 3-12-62 Notes relative to a meeting between JPL, LOD, ASTR, and I&M to discuss evaluation of Centaur guidance systems. ✓

2. AGENA:

a. Gemini: A meeting was held at LMSC on Apr 10 to discuss the propulsion system for Agena "D," including multiple restart, secondary propulsion, and the chamber pressure switches.

AFSSD is hoping that the main propulsion system for Agena "D" will be bought as is. As far as the program can be foreseen presently, this will essentially be the case.

LMSC favors the metal bellows expulsion device for the multiple restart system because it has greater cycle life, zero permeability (therefore, less components), greater reliability, and better behavior at low temperatures, than all other flexible plastic bladders considered. Some hardware is available. This system has received considerable testing and development time to date, and LMSC feels sure enough about this expulsion system to recommend go ahead on this system for the Gemini. LMSC states that start of the Agena main propulsion system can be accomplished in 1½ seconds.

LMSC sees no particular problem with the secondary propulsion system. It is mostly a matter of detailed system optimizing and available velocity capability. Studies are in process on this and, also, on the compatibility of the pressurization system, and removal of the chamber pressure switches. ✓

b. Project Fire: The Project Fire Project Development Plan was approved Dec 18, 1961. Since that time the Work Statement for the Atlas "D" booster has been prepared and the first increment of funds (2.4 million) placed in the contract. Atlas No. 263 will be procured under Contract AF-04-647-699 and Atlas No. 264 will be procured under Contract AF-04-694-47. Langley Research Center awarded a contract to Chance Vought Aeronautics early in Mar for a Velocity Package Design Study. Republic Aviation was selected as the source for the reentry package on Apr 1, 1962, pending successful negotiation of a contract. All other contractors and agencies are on board and the Modes of Communications have been established with each, with the exception of Republic Aviation. ✓

c. OAO: An OAO interface meeting was held at GAEC covering structural and mechanical interfaces, thermal interfaces, electrical interfaces, and AGE interfaces. All major design and configuration problems were agreed upon. Action items for all interfaces were generated and distributed, and most will be resolved by the end of May, 1962. ✓

2 (Grumman?) B

B 4/22

Memorandum for Record

April 2, 1962

M-ASTR-TSS

Centaur Guidance Review with JPL

1. JPL reconsidered injection guidance requirements for lunar and interplanetary missions for the future, 1965 - 1966.

2. It was agreed to take as measure for the accuracy of an injection guidance system a figure of merit (FMO) - the rms. value of maneuver required to correct the trajectory in m/sec, computed for properly correlated component errors. (An analytical method by JPL)

3. M-ASTR compiles from all available investigation and measurements made so far on the presently available guidance sets and components, the error contributions including laying errors (2 modes are considered - gyro compassing and optical). These error contributions (realistic ones - not spec. values) will be processed by JPL's computer programmer - FMO method. Results should be: revised tolerances for guidance system accuracy; if possible relaxed specifications resulting in simplification in mechanization and thus higher reliability.

4. Presently under consideration are:

a. A modified M-H inertial guidance system or a guidance system other than M-H.

b. With respect to accuracy requirements, even an "Agena type" guidance would be feasible according to preliminary considerations by JPL.

Hubert E. Kroh

HUBERT E. KROH

B 4/22

Mr. Hueter, Director, Light & Medium Vehicles Office, M-L&M-DIR

April 9, 1962

Astrionics Division

CENTAUR Guidance System Review, Status of Study.

1. In view of the responsibilities for Centaur recently assumed by Marshall Space Flight Center, a deliberate and methodical approach to the system evaluation has been started.

2. Evaluation of the current Centaur hardware is being done by a working group headed by Mr. Thomason of Astrionics Division. The result of this evaluation will be a recommendation concerning the reliability of the present system and the applicability of the prelaunch preparations necessary to assure the operational accuracy of the system. The group may recommend hardware changes based on their evaluation.

3. Evaluation of the current Centaur performance is being done by selected individuals in the Astrionics and Aeroballistics Divisions. Data is being collected from Minneapolis-Honeywell, St. Petersburg, Florida, from the operational tests being made at Cape Canaveral on Vehicle F-1, and from the records of General Dynamics/Astronautics, San Diego, California. The data from the first two sources is essentially finished with only the data expected from the F-1 firing lacking. As soon as the firing of F-1 is evaluated, GD/A will be visited and data accumulated from that source. The result of this evaluation will be a recommendation as to the validity of specifications on error data and a judgement of this Division as to what degradation factor should be applied to the specifications for future study and applications by the customers (Advent, JPL, etc.).

4. Since the current weight capability of the Centaur limits its use in the Advent program to the second cutoff point (injection into the transfer orbit), a study has been initiated to evaluate the guidance system performance in this mode of operation. The same limitations indicate that the interplanetary missions under the cognizance of JPL will be changed also. As previously advised, it was decided that the JPL method of evaluating injection performance would be used to evaluate the present Centaur hardware and other hardware errors for this limited mission. JPL has sent to your office the necessary computer programs to initiate such a study.

The Aeroballistics Division has the responsibility of making these error studies, with the Astrionics Division furnishing the appropriate error contributions. As soon as this program is set up in the 7090 computer, checked, and operating, it should be possible to evaluate the Centaur missions using various error data in such a way that any particular system within reason could be evaluated without too much delay. This study does not necessarily involve actual specifications for any system, but uses ranges of errors expected from the simplest to the most sophisticated guidance system compatible with the Centaur vehicle. It must be pointed out, however, that this effort is still on a low effort basis and could only be performed with the help of the programming already done at JPL.

5. As was previously discussed, a review and evaluation of other vehicle systems is under consideration at this time. A study of the Titan (system) is being performed by a NASA committee, and in order to avoid duplication of effort, limited study on Titan III will be done pending receipt of an official committee report. We are actively engaged in obtaining all available specific data on the Titan II. The Polaris guidance and ST-120 S will be investigated at a later date. It is expected that the overall investigations mentioned above will conclude in a set of information that will make future decisions concerning the necessary accuracy for the various missions relatively simple to derive.

6. It should be clear from the above that the effort of the Astrionics Division is progressing rapidly and that the next step should be the implementing of the digital computer programs received from JPL. As this evaluation effort develops, we shall furnish your office status reports at appropriate intervals.

for W. HAEUSSERMANN
Director
Astrionics Division

Copies to:
M-AERO, Mr. Braunlich
M-L&M-C, Mr. Evans
M-ASTR-TSS, File
M-ASTR-G, Mr. Thomason
M-ASTR-N, Mr. Gassaway

NOTES 4-16-62 KUERS B 4/22

Mr. Kuers, Please attach copy of last weeks NOTES when answering a question. See Procedures

1. Shrouded Version of the Dummy Apollo for SA-5: In reply to your question regarding this item in last weeks notes, we did, as you assumed, have reference to the 154/105 Inch Adapter between the Saturn C-1 Guidance Slice and the Jupiter Instrument Compartment. ✓

For comment on TWX to Holmes? JCM 4-16

2. Boeing Facility Plan: In spite of our agreement with Mr. Coenen, Operations Manager, Boeing still included the large 200 ft. high building in their proposal as an alternate to our proposal. They reduced the area of this building by 5,000 sq. ft. by omitting one assembly station. Boeing rated the cost of this building lower than the two level building favored by this division.

W.K. JCM 4-16 → It's entirely up to us to reject the alternate and pick what we think is in the best interest of the govt. B

* JCM

3. Boeing Wichita Facility: In accordance with your wish to visit the Boeing Wichita Facility, a one day trip by special plane will be arranged. Details will be worked out with your secretary. ✓

Suggest to count me out. B

We have discussed with Mr. Wilbur Davis the probability of being confronted with a high overhead rate at Wichita due to the hazy picture of their future workload. Mr. Davis would like to negotiate the establishment of a ceiling on their overhead rates. We will also look into the feasibility of partitioning their plant in order to set aside an area for S-1C work. Wichita's future workload possibilities lie in the area of the Navy Experimental Vertical Ascent Aircraft (VAX) and the joint Navy-Air Force Experimental Tactical Fighter (TFX). A decision on TFX is due by May 1. ✓

NOTES 4-16-62, Lange

B 4/22

1. C-5

S-IC: A meeting at Michoud Operations reviewed the Boeing Plant activation plan which included many trade off studies to back up the Boeing recommended plan. Copies will be distributed within MSFC for coordination on 4-16-62. ✓

On 4-10-62 Boeing Management and SSO reviewed and analyzed Boeing's understanding of MSFC's requirement under the preliminary contract and our progress in view of fund limitations within FY-62. As a result, Boeing will proceed to realign their personnel at MSFC such that those located within the divisions will be on a permanent basis. ✓

According to directions of M-DEP-Adm. the ME Division's tooling and hardware requirement supporting the non-flight vehicles will be placed as supplement to the preliminary contract. ✓

* S-II: Meeting was held last week at WOO & NAA with Navy personnel to explore ways and means of moving rapidly with Seal Beach facilities, when A&E money is released. ✓

SATURN Systems Office and RIFT personnel will review and determine the pros and cons of the (S&ID) proposal for manufacturing the RIFT tanks in support of the prime contractor. ✓

* S-IVB: Studies and plans are underway to bring the program within an acceptable funding level by reducing the program to 6 flight vehicles. ✓

[redacted]

2. Apollo

MSC/MSFC Mechanical Integration Panel met for the first time at Huntsville. NAA was amply represented. Mr. Reed (M-AERO) shortly briefed NAA people on aerodynamic problems of present Apollo configuration. Full meeting on this matter is planned for end of month. Although no official word from MSC about mission changes for SA-5 to 10 is available, discussions on this question are presently going on at MSC. ✓

NOTES 4-16-62 Maus

B 4/22

1. HEADQUARTERS DIRECTIVE ON SCHEDULING - The Headquarters' scheduling directive expected on April 10, 1962, has been delayed due to discussions within OMSF. The discussions involve the depth of reporting required, the frequency of reporting, and the extent of guidelines which OMSF will furnish the Centers. Jay Foster will review and discuss the revised document with Mr. Lilly's office in Washington on Tuesday, April 17, 1962. ✓

2. MSFC MANNED SPACEFLIGHT PROGRAMS STATUS - We are preparing your half-hour presentation on program status for the April 24th Management Council Meeting. We will get this to you on April 20. ✓

3. MANAGERIAL DATA CENTER - We have a lot of work to do in this, but we are getting started; this will include an overhaul of the Fact Book. ✓

4. ANDRESSEN'S TRIP TO HEADQUARTERS - April 10th and 11th, was spent discussing working relations and problem areas with each of the program offices, the Office of Programs and the Management Analysis Division.

Following are the highlights of this meeting:

1. All program offices felt that the Central Planning Office would be very helpful to them as a central contact point. ✓

They indicated that JPL and MSC were organizing similar offices. ✓

OMSF is preparing a draft of the responsibilities of each of its sub-offices and how they relate to each other and the Centers. ✓

* 2. According to OART it appears that Dr. Seamans is serious in his desire to remove all non-project oriented technology from OMSF and OSS responsibility. OART has requested that we identify and report the amounts included for technology under projects in FY-62 in order to assist them in justifying the apparent increases in 63 and 64. ✓

Kuehl, Stallings please note. 4-16

3. Presented detailed comments of MSFC on budget cycle to Mr. Carulli of the Management Analysis Division. ✓

NOTES MRAZEK 4-16-62 B 4/22

1. TITANIUM - HYDROGEN TESTS: In connection with the Centaur program and subsequent to a presentation from this Center on the reactivity of titanium with oxygen, NASA Headquarters requested tests to determine if fires resulting from leakage of hydrogen from titanium tanks could heat the metal sufficiently to initiate a violent reaction with the surrounding air. Two small, thin-wall titanium tanks were insulated with a 1-inch thick coating of polyurethane foam, filed with LH_2, punctured with a pin, and the escaping gas was ignited. The insulation was burned completely in the ensuing violent flames. However, there was no appreciable reaction of the titanium with the air, even though the test was carried to complete consumption of the H_2 (20 minutes). A film of the test will be available.

2. H-1 TURBINE EXHAUST: A metallurgical examination of several H-1 engine turbine exhaust hood and bellows assemblies revealed welds of extremely poor quality and poor weld joint design. In view of the recent history of failures under 188K operating conditions this was brought to the attention of Rocketdyne and the company was directed to redesign the part immediately and exercise adequate quality control procedures in the future. A plan of action was agreed upon in which a resulting qualified duct can be retrofitted as early as SA-3 and SA-4.

3. STATUS OF BOEING PERSONNEL: Boeing personnel working in Division 4-10-62: Advanced Flight Systems Branch - 6; Vehicle Engineering Branch - 52; Structures Branch - 57; Propulsion & Mechanics Branch - 34; Engineering Materials Branch - 7; Systems Integration Office - 5. Total on board - 161. 53 additional personnel are expected by the end of April. Many of the personnel now on board are temporary.

4. RIFT:

a. Martin, General Dynamics/Astronautics, and Lockheed gave oral presentations on their RIFT proposals on 3-9/10/11-62 respectively.

b. North American S-II Project people gave a presentation (4/11/62) on their proposal to fabricate RIFT tanks in the Seal Beach S-II production line. The SATURN Systems Office and Nuclear Vehicle Projects Office are integrating schedules which, so far, appear incompatible with program requirements.

c. A Nuclear Facilities Committee, patterned after the F-1 Edwards committee, has been proposed for MSFC. The charter and supporting documents are currently being circulated by the Nuclear Vehicle Projects Office for review and comments.

5. VEHICLE SYSTEMS INTEGRATION ACTIVITIES: See attached flash report.

6. LONG LEAD TIME ITEMS FOR C-5 PROCUREMENT: A meeting will be held on 4-17-62 with representatives of M-P&VE, M-ME, M-QUAL, M-P&C and M-SAT to discuss the handling of procurement of this hardware.

Attachment:
Memo dated April 16, 1962 subject: Flash Report on Recent Vehicle Systems Integration Activities

GEORGE C. MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA

Memorandum

TO Mr. Mrazek, M-P&VE-DIR DATE April 16, 1962

FROM Chief, Vehicle Systems Integration Office M-P&VE-V-12

SUBJECT Flash Report on Recent Vehicle Systems Integration Activities

1. On Thursday we had the first meeting of the APOLLO Mechanical Integration meeting. Only three of the four permanent MSC members showed up and six NAA people participated. Our meeting was timed a bit unfortunate in view of the Monday presentation to Dr. Von Braun. Not much was said about the plans of MSC since they didn't want to spill the beans prior to the presentation. I have the feeling, MSC doesn't see these meetings as something required. It is probably somewhat awkward for them, at least in our hardware area, since they don't make the design and probably don't know too much more about NAA's design yet than we do.

2. They agreed readily to direct discussions and exchanges with NAA if we keep them properly informed. I believe they want us to knock our horns off on NAA. The NAA APOLLO team appears to me quite a bit stronger and more agressive than our S&ID, S-II contractor. It could be, they are just tougher to us because we cannot direct them ourselves.

3. The MSC people left the same afternoon and left us with NAA on a few direct items. One is the mating ring to the Instrument Unit, NAA thinks we overdesigned, for SA-5 and SA-6. They agreed to match our design. Douglas tooling will be used by NAA.

4. Another hot item is the complex 39 concept of only one access from the pertaining umbilical and the "no servicing" on the pad. After much heated discussion, we all calmed down and agreed to take a positive look at each others requirements.

5. I have to side with NAA on some points against LOD. In the Space Craft, every pound of weight is precious and bringing all service and access to one point will cost weight. The Space Craft is not as roomy as our booster and cannot be serviced from the inside.

6. NAA's request is for one umbilical area with the normal electrical, pneumatic, topping etc. connections on Space Craft till lift off and for a jo-jo type servicing arm with clam shell platform to reach any point up and down and around their end of the vehicle.

MSFC - Form 488 (August 1960)

SUBJECT: Flash Report on Recent Vehicle Systems Integration Activities

April 16, 1962

7. LOD will look at this, a probable solution is to provide for two servicing umbilicals which can be removed minutes before lift-off.

8. NAA disagrees with our 73° from fin I location of umbilicals. They will have theirs on 60°. They are firm on this for Space Craft design reasons.

9. Beginning next week LOD will take another look at all stages and the complex 39 to finalize the umbilical requirements including once more the radial location of umbilicals. NAA was invited to participate with a representative for the whole design criteria period and wants to, providing MSC OK's.

10. Some other specific items discussed were:

a. Alignment and mating tolerances in the interface area and the establishment of control drawings.

b. The LEPS tower. The tower will be simulated on SA-5 and SA-6 in a boilerplate fashion. NAA voiced the desire to get rid of the tower as quick as possible after separation. This will be forwarded to the Dynamics Panel since the timing is solely dependant on regaining control of the S-IV stage.

c. It was brought out, that we always talk about the Q-ball, but nobody has yet officially required it. We made this now official from this Panel for SA-5 and SA-6.

d. NAA will provide a membrane between the Instrument Unit and the Space Craft for SA-5 and SA-6, because of our environmental conditioning.

e. The Dynamics and SA-5 and SA-6 payloads are quite different from SA-7. No requirement was made to NAA yet to deliver a SA-7 dynamics payload. The whole Dynamics test program was discussed and our people will have an answer by the next panel meeting.

f. A complex question needs urgent attention, this is the coordination of the coordinate system used by the two Centers. The x, y, z system used by MSC is quite different from ours and our people are easily confused. NAA pointed out, it is not their system but the NASA system to which they had to change. I understand that Dr. Speer works on this. Emphasis should be placed on this before too much paper work is created.

g. The service module in SA-5 and SA-6 is just a dummy spacer, in SA-7 and SA-8 still a dummy, but with the separation splice added.

h. The Space Craft propulsion module consists of a 20K storable liquid propellant, pressure fed system, ablation cooled engine.

i. The installation of explosives at the Ordnance Tower was discussed. This question was brought up by the other stage contractors before, and we have now scheduled a meeting on May 3, with LOD and all C-5 contractors to iron out our mutual problems.

11. C-1 Area:

An interesting discussion was held with Lindstrom and Bramlet. Management plans are finally formulating in the direction we have been fighting for as the only sensible means to accomplish our jobs. CSD will have a contract to build boosters thru approximately SA-117, this is all, the next contract will say at this time, no systems engineering now, only training in this area, we want to keep the systems management during the early manned flights. No objections on my part B

12. Mr. Lindstrom will provide CSD with a phase out plan next week. This means CSD will finally be told in clear terms what they are to do and we get some of the pressure off to turn things over, we are not ready for yet. Agree.

13. M-SAT will present to Dr. von Braun, on next Thursday their management plan for the C-1, which looks very sensible to me and depending on what Dr. Von Braun will buy off, we can then get clear instructions.

14. Astrionics Division (Mr. Fichtner) is much more worried about the split or turn-over of systems responsibility than we are. Their vehicle, GSE and automation business is so much more involved in long range operations, that it is inconceivable at this time to give this up to another organization.

15. We may get the same feelings if the mechanical portion of the GSE is organizationally reassigned to another Center. Even if everybody tries to keep things running especially smooth now, in the long run things will get harder to get across. It won't (Stage-related GSE remains at MSFC) B

16. The Instrument Unit will eventually be let out under contract like a separate stage. Apparently it will not be contracted to Chrysler.

17. In the S-IV stage, helium bubbling tests were performed at Sacto to bring the lox inlet conditions within acceptable temperature range. The tests were performed with warm helium and were not satisfactory, and will be repeated with cold helium, when available.

SUBJECT: Flash Report on Recent Vehicle Systems Integration Activities — April 16, 1962

18. The JUPITER nose-cone-adapter payload for SA-5 and SA-6 as back-up to the MSC design will be delivered on schedule for dynamic testing.

19. In the S-II area, I was supposed to answer on the gox pressurization system problem The gox entering the tank has about 500°F temperature. This is too severe a temperature gradient across the common bulkhead. To cool the gases, liquid oxygen will be tapped off and injected thru a bypass loop into the hot gox after it leaves the heat exchangers to cool it down. There will be some weight penalty. We are thoroughly investigating.

Why not use a smaller heat exchanger and heat it less? B

20. In the S-IVB area, this coming week, we will have a meeting with Douglas, S&ID, and Rocketdyne on the possible use of a common P. U. System.

21. I concurred to Saturn Systems Office in a memo, that the customer connect Panel on the J-2 engine will not be government furnished to the stages, but the connections will be the responsibility of the stage contractors.

22. In the S-IC area, we have a problem, more in MSFC than in our division. Under the present contract, Boeing is required to furnish a number of plans, among others a Model Spec and Test Requirements Plan. Since Boeing doesn't really know what the stage will look like since we are designing it, they have a hard time to come up with sensible documents, which will be acceptable to us. They asked for support in coordination and reviewing these plans and I thought I would help them. I called a meeting of Division and Saturn Systems Office representatives to explain why we need to help Boeing in this matter.

W.M. suggest on discuss this w/h Lange B

23. Unfortunately Saturn Systems Office didn't attend the meeting since they felt, they didn't want to discuss the contractual implications in front of Boeing, but we have no explanation either, yet. Then the Division representatives began asking why Propulsion and Vehicle Engineering Division was pulling this kind of a thing together for the Center. These kind of questions are embarrassing when one isn't really authorized to run these things yet. ? ?

24. There is an urgent need to identify the one source in MSFC responsible for the coordination of engineering requirements, whoever that may be. Who is the final engineering review authority of these documents, since after all, they will be binding for us after approval and will cost us money if they are not compatible with the vehicle design?

25. Boeing people were inquiring how they fit into our Working Group set-up. I told them that as long as they work here in-house, we don't need any Working Groups on the S-IC and at some later time

SUBJECT: Flash Report on Recent Vehicle Systems Integration Activities

April 16, 1962

I will invite them to some interface meetings with the other contractors.

26. In the meeting with Mr. Bramlet we found out, that the new contract will be patterned very much along the lines of the S-I contract which will provide us with a much clearer spelled out authority.

O.K.

H. R. Palaoro

H. R. Palaoro

B 4/22

NOTES 4-16-62 Stuhlinger

1. MILAN SPACE CONGRESS: Mr. Heller is to represent NASA and will present a paper at the Space Congress in Milan this week. This congress is organized by the International Man in Space Association with Professor Ambrosini as President. Discussions have been held with Mr. Frutkin, Director of the Office of International Programs, and Mr. Heller is going to see Mr. Frutkin again prior to his departure. ✓

2. UNIVERSITY OF ALABAMA RESEARCH INSTITUTE: Mr. Milton Cummings informed us that an industrial firm offered a donation of $50,000 for the Research Institute. Dr. Shelton and Dr. Lundquist will contact Dr. Hermann to discuss with him the most appropriate use of this money (possibly for the library).

We expect to fund four University of Alabama research contract proposals, including two for the Institute in the near future. ✓

3. UNMANNED LUNAR LANDING: I held several discussions within MSFC, and with members of JPL, in connection with the unmanned lunar landing project. Dr. Lundquist and I will visit JPL on Thursday this week. In view of the limited objectives of the former "Prospector" Project, and of its recent failure to obtain funding support from Congress, I wish to suggest that the present project with its very direct tie-in with the "Manned Lunar Landing Project" be renamed, and that it be called "SHERPA". This name should imply that the vehicle will be a self-consistent and independent unit, but that it will carry out its mission as a scout and carrier in the service of a greater project.

E.S.
Let's discuss this again
B 4/22

4. EUROPEAN TRIP: I returned from a trip to Europe where I was involved in a seminar on electric propulsion, and in a number of discussions on German and European space projects. Interest in space exploration, and in space flight, is remarkably high among scientists and engineers in many European countries. ✓

Wasn't this completely covered in a separate note? Jim

NOTES 4-16-62 Rudolph B 4/22

1. Space Electronics & Telemetry Symposium:

   Thanks a million for having marked your calendar as banquet speaker.

   I certainly will settle for a replacement speaker in case you have to cancel, even on short notice.

   Again, thanks a lot for your great favor. ✓

2. Medaris' Letter:

   I have started going over the articles and comments.

   Have read PERSHING article. Will write comments.

   Will give you complete package before end of week. ✓

3. Shea's Office:

   Will send you chart on structure of Shea's office, including JPL's portion, with next notes. ✓

NOTES WEIDNER 4-16-62

B 4/22

1. F-1 ENGINE PROGRAM: The F-1 Engine successfully marked up another major milestone. On 4-11-62 engine #004 was fired for a full duration of 151.86 seconds at 1140K thrust level.

2. M-1 ENGINE PROGRAM: Letter contract documents for R&D and for the facilities portion of the M-1 engine program were hand carried, in draft form, to NASA Headquarters on 4-5-62. $22.0 million of funds have already been committed to the M-1 program for FY-62, but authorization for fund obligation has not been received from NASA Headquarters.

3. J-2 ENGINE PROGRAM: The latest test (# 029) of the J-2 engine system was of a 2.5 sec. duration. A thrust level of 142K was obtained which is equivalent to 210K at altitude. This test was scheduled for 5 sec. but was cut due to rough combustion. The rough combustion was due to cavitation in the LOX pump, which in turn was caused by the pressure drop in the inlet lines being greater than anticipated, thereby causing a loss of suction pressure. Also, during this test a patch on the tubes blew off and caused damage to two ajacent tubes. This damage will be repaired and future firing duration of this engine will be limited to 1 sec. (The patch had been put on during thrust chamber buildup).

4. H-1: A LOX pump explosion in green-run occurred at Rocketdyne after 148 seconds of testing. This explosion was mentioned on last weeks notes. A preliminary investigation now indicates a No. 2 bearing failure allowed the main pump shaft to move in the direction of the LOX volute with a resulting rubbing of LOX pump parts.

5. GENERAL: Keith Chandler has been appointed the MSFC representative on the ad hoc committee under Del Tischler to study the propulsion requirements and suggest systems to be used on the Lunar Orbit Landing Vehiclel ("Bug" Mode).

April 23, 1962

NOTES 4-23-62 GORMAN B 4/24

1. AIR FORCE VISIT - Colonel Walling, Deputy Commander of the West Coast Management Region, Air Force, was at Marshall on April 18 to work out an agreement on Air Force support to our project offices planned for the West Coast area. He told me that North American had made a proposal to the Air Force that the Canoga Park facility be devoted to NASA work exclusively. The Air Force had returned the proposal to North American with the request that North American provide alternate proposals. Since the Air Force intends to make a decision very shortly, I have asked Dave Newby, Lee Belew, and Chauncey Huth to look into this with North American and the Air Force a little further and prepare a position paper on how we would propose to handle the Rocketdyne operation if the Air Force decides to turn over the facilities to NASA. Washington Headquarters has not been advised of this pending the Newby, et al, report.

2. SUB-CONTRACTS - Washington Headquarters wishes to consent to sub-contracts in excess of $5,000,000. It looks like this may have grown out of the McClellan Committee investigations.

3. BUDGET ESTIMATES - The initial FY 1964 Preliminary Budget Estimates were developed for the Tracking and Data Acquisition Program and forwarded to Washington. Manpower and dollars are summarized briefly as follows:

Fiscal Year	Man Years	Cost (In thousands of dollars)
1962	36	2,115
1963	60	7,265
1964	72	7,975

We had not previously budgeted funds under this program. The FY 1962 amounts were actually carried under Launch Vehicle Technology, Saturn, and other programs.

4. AIR SERVICE - Delta Air Lines has a proposal for non-stop Orlando-Huntsville-Dallas service under study. If considered desirable when analysis is complete, Delta would want NASA support before Civil Aeronautics Board.

NOTES 4/23/62 CONSTAN B 4/24

1. RENOVATIONS AT MICHOUD

a. Office Building:

(1) Installing reflective ceiling in Executive Suite. Approximately 90% complete.

(2) Painting walls in Executive Suite.

(3) Installing chilled water lines. Approximately 50% complete.

b. Engineering Building:

(1) Repairing electrical circuits and lighting, east end, first floor.

(2) Painting walls and woodwork, second floor, west end.

(3) Completed floor tile from Column 31 to west cross-over.

c. Boiler Plant:

(1) Installing chemical feed pumps.

(2) Pressure testing air conditioning compressors. Two (2) completed.

d. General:

Main sub-station completed except for new bushings which are on order.

2. CHRYSLER EQUIPMENT

A meeting was held at Michoud to discuss the status of reviewing equipment lists submitted by Chrysler. The main topic of discussion was how to speed up the screening action required and/or procurement. Action has been initiated to exert all efforts to speed up the processing of equipment requests. Chrysler has agreed to submit to M-MICH not later than April 27, 1962, complete lists of their machine tool requirements.

3. BOEING RESPONSIBILITY

(SHOULD NOT BE SENT TO WASHINGTON)

Mr. Stoner, Boeing Company, called Mr. Constan from Seattle on April 20, 1962, with reference to Boeing's role in developing sources for components in the S-IC. Mr. Stoner stated that about a week ago he was told by the Saturn Systems Office that he was going to be given such a responsibility. Then, subsequently, he was told that MSFC would accomplish this responsibility directly through their own sources. Mr. Constan called Mr. Dannenberg on April 20, 1962 to ascertain which approach should be followed. Mr. Dannenberg stated that he would call Mr. Stoner and clarify this issue.

4. VISITORS

On April 22, 1962, Congressman Benjamin F. Jensen of Iowa and Robert M. Moyer of Jensen's staff will arrive in New Orleans. They plan to visit the Michoud facility on April 23. A briefing of the Michoud Operations and Saturn Programs as pertains to Michoud will be presented. They plan to depart from New Orleans in route to Orlando, Fla. at 5:55 p.m. on April 23.

5. CONTRACTUAL ACTIVITIES

a. Vector Corp. of New Orleans was awarded this week a contract by MSFC for A-E design of Michoud Operations Facilities. Estimated Amount $324,664.

b. Boeing delivered this week the following:

(1) Plant Activation and Flow Plan

(2) Tooling & Facilities Plan

(3) Instrumentation Plan

(4) Reliability Plan

c. Scope of work covering support services for the Mason-Rust follow-on contract was furnished M-P&C this week.

NOTES 4/23/62 DEBUS

No NOTES received from Dr. Debus this date. ✓ B 4/24

NOTES 4-23-62 GORMAN B 4/24

1. AIR FORCE VISIT - Colonel Walling, Deputy Commander of the West Coast Management Region, Air Force, was at Marshall on April 18 to work out an agreement on Air Force support to our project offices planned for the West Coast area. He told me that North American had made a proposal to the Air Force that the Canoga Park facility be devoted to NASA work exclusively. The Air Force had returned the proposal to North American with the request that North American provide alternate proposals. Since the Air Force intends to make a decision very shortly, I have asked Dave Newby, Lee Belew, and Chauncey Huth to look into this with North American and the Air Force a little further and prepare a position paper on how we would propose to handle the Rocketdyne operation if the Air Force decides to turn over the facilities to NASA. Washington Headquarters has not been advised of this pending the Newby, et al, report.

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NOTES 4-23-62 GRAU B 4/24

1. QUALITY ASSURANCE DIVISION REPRESENTATIVES AT TEST DIVISION AND LAUNCH VEHICLE OPERATIONS DIVISION: A Representative has been placed in each of these Divisions to review procurement requests, quality assurance provisions and assist design personnel on quality assurance matters. ✓

2. CENTAUR: X-ray examination of the C-2 (F-3) vehicle after completion of tanking tests at Sycamore Canyon revealed cracks in the intermediate bulkhead welds. This tank was rejected for flight purposes and will be redesignated for use on a test vehicle. ✓

Have to do again

3. S-IV: Two Quality Assurance Division Branch employees were assigned to extended TDY at Douglas Aircraft Company as requested by the Saturn Systems Office. Efforts will be concentrated in the structural fabrication area. Personnel at Douglas have been convinced by this Division of their need for a training program, and this program will begin on April 23, 1962. ✓

B 4/24

NOTES - HAEUSSERMANN 4/23/62

1. EXAMPLE OF AGREEMENTS BETWEEN M-QUAL and M-ASTR: Discussions of M-ASTR and M-QUAL representatives lead to agreements on the application of MSFC and NASA quality policies and publications to ASTR procurement actions. M-QUAL has one representative stationed at M-ASTR for advice in these areas.

* 2. C-1 BLOCK II CONTROL STUDY: Flight Dynamics Branch is performing a C-1 Block II Control Study utilizing body fixed accelerometers for angle of attack control. Preliminary results indicate that satisfactory rigid and elastic body dynamics can be obtained and the angle of attack reduced to an acceptable value by the use of accelerometer control. Uncertainty in elastic body dynamics data is of primary concern in determining the control system gain and shaping requirements; therefore, final decision on accelerometer control must be delayed until SA-D5 dynamic test results are available. Flight Dynamics Branch has recommended: (1) That control system design proceed with accelerometer control as the primary approach and (2) That the tower mounted Q-ball, and Jupiter nose cone with local angle of attack meters be provided as alternates. The Jupiter nose cone (which is now a back-up pending wind tunnel results) and the tower mounted Q-ball are requested since the results from SA-D5 dynamic test may eliminate the body fixed accelerometer as a control sensor, i. e. if elastic body dynamic results from the SA-D5 tests were such that satisfactory gains and shaping for stability could not be achieved.

3. PERSONNEL AT THE CAPE: A total of 36 employees will be at the Cape in support of SA-2. The group will be comprised of technical personnel from the following branches: Instrumentation, Navigation, Electrical Systems, Flight Dynamics. We will have two observers down for this launch.

Dr. von Braun:
Were you satisfied with the Haeussermann-Cram memorandum of understanding? JCM 4-23

Yes. B

NOTES 4/23/62 Heimburg

B 4/24

1. S-I-3:

Five engines have been removed from S-I-3 because of the turbopump gearbox vibration problem. So far, three gearboxes have been disassembled and inspected. The No. 1 (LOX pump shaft) bearing was found damaged in one gearbox. Damage to the No. 2 (fuel pump shaft) bearing was found in another ~~(see attached photograph).~~ No damage was found in the third. The main objective at this time is to determine if measurements can be recorded during tests that will give us a definite indication of bearing trouble. If this cannot be established with confidence, it means that the only way to detect a bad bearing is to disassemble and inspect. Investigations are continuing.

Present indications are that the next static firing will be conducted about 5/15/62. This is a conservative estimate.

2. SLOSH FACILITY:

Test Division is proceeding with plans to modify and adapt the South Bay of the Dynamic Test Stand to provide a fluid dynamic test facility for simulating vehicle pressurization and propellant systems for the C-5 slosh program. This facility will also provide a capability for full-scale component testing of propellant suction line hardware and later hydrogen slosh tests. Funds are available and tests should begin in May '63.

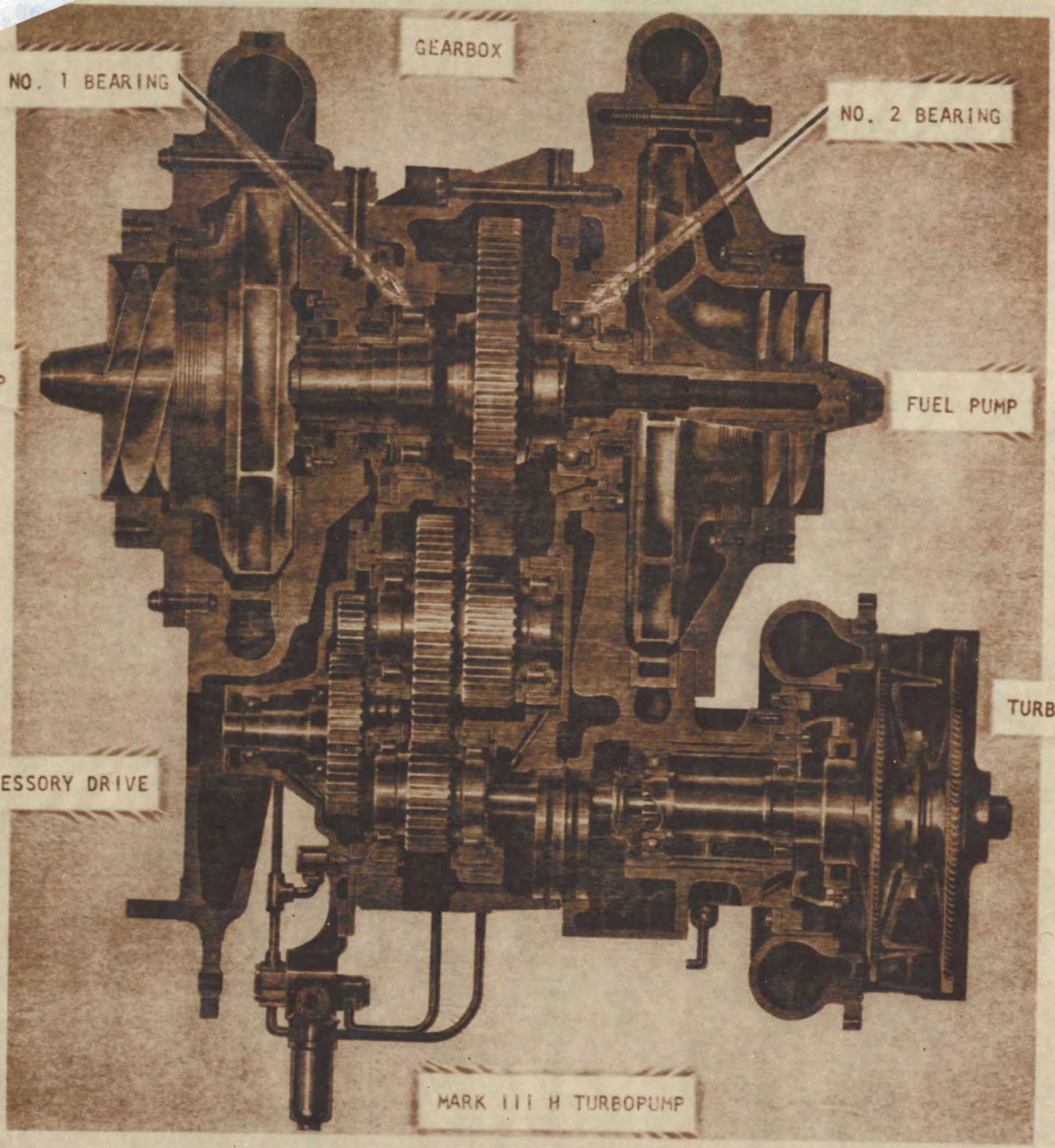
3. MARINE FACILITIES:

The East Pearl River and seaward approaches were inspected by launch. Indications are: The river may be easily and safely used by vessels of the "PROMISE" class. Some dredging will be required in the way of three sharp turns.

Michoud waterfront facilities were inspected and a study is underway at MSFC for pier site selection.

Regarding our previous report on marine equipment acquisition, the total number of vessels we requested could not be released owing to the (reported) higher and earlier priority of the Task Force supporting the AEC Christmas Island Tests.

ATTACHMENT:
Photograph


GEARBOX
NO. 1 BEARING
NO. 2 BEARING
LOX PUMP
FUEL PUMP
TURBINE
ACCESSORY DRIVE
MARK III H TURBOPUMP

B 4/24

NOTES 4-23-62 HOELZER

1. COMPUTER SYSTEM FOR COMPILING STATUS OF CONTRACTOR FUNDS: The contract NAS-8-1524 which was let for an overall system study for computer automating the technical paperwork in Quality Assurance Division has been extended until Sept. 16, 1962 in order to design a computer system for financial reporting by MSFC contractors. The initial application will be between MSFC and Michoud. The original contract was for five people for eleven months for $87,000. The extension calls for ten people for six months and $144,000. Nine of these people are aboard and planning meetings are being held with Mr. Gorman's people, including Financial Management Office personnel, for the purpose of implementing this contract. See attachment 1 (Notes 2-5-62 Hoelzer).

How is the ADPS Working Panel coming along (of which you and Mr. Moore are co-chairmen)?
JFM 4-23

Attachment 1 - Notes 2-5-62 Hoelzer

NOTES 4-23-62 HUETER B 4/24

1. CENTAUR:

F-1 Launch Attempts: On Apr 20, 1962, the fourth launch attempt for F-1 was scrubbed because of inability to load liquid oxygen into the Atlas. During the initial attempts to load liquid oxygen, a ruptured disc failed in the topping line and the delay in operations produced an outer limit temperature condition for the liquid oxygen in the Atlas. The temperature of the LOX in the Atlas had risen above a redline condition which is imposed to insure the necessary net positive suction head conditions at the engine pump inlet. A hold was made and the burst discs in the replenishing lines were replaced. The count was resumed at T-60. Ruptured disc failed again in the replenishing line and also in the main fill line. During the evening the ruptured discs were replaced with safety valves. The launch was rescheduled for Apr 21, with the countdown picking up at T-155. The launch attempt was automatically shut down after the Atlas holddown period. The preliminary investigation into cause of non-release of missile has been traced to the reverse connection of two identical electrical connectors which controlled hydraulic actuators which in turn disconnect fill and drain lines and pneumatic service to the Centaur through the lower umbilical boom. These disconnects occur at different points in the launch sequence and due to interlock provision or the lack of necessary feed-back signal ~~required~~ the release operation was not activated. An interim report and revised schedule is being prepared by LOD and CD/A and should be available today or tomorrow. ✓

2. AGENA:

a. Mariner R: In response to your note on Dr. Newell's letter of Mar 29, the launch date for Mariner-R-1 is Jul 21 with the launch period extending through Sep 10. The launch date for Mariner-R-2 is 24 days after the launch of the first, with a launch period beginning on that date and extending through Sep 10; therefore, the earliest launch date for the second vehicle is Aug 14. The Jul date is based on current performance capability. ✓

b. Nimbus: The launch date for the first R&D Nimbus will be delayed at least four to six months due to Spacecraft problems. ✓

c. EGO: The launch date for the first ECCENTRIC GEOPHYSICAL OBSERVATORY (Mar 63) will be delayed at least three months, again due to Spacecraft problem. ✓

d. Ranger 4: The countdown is underway, no problems are anticipated, and launch is expected to proceed as scheduled at 2:09 PM CST today. ✓

e. A-12: NASA Hq has notified MSFC that the A-12 launch date will be delayed substantially. A firm date will follow later. Due to this slip, LMSC has been instructed not to remove Agena 6301 from storage until further notice. ✓

f. Gemini: A meeting was held at MSC, Houston, Texas, on Apr 16 for a presentation by LMSC on controls and communications. The presentation covered both on-board and ground equipment networks for Atlas/Agena and Titan II spacecraft. The presentation demonstrated the complexity of the system and a need for close cooperation between LMSC and MAC to come up with a compatible system. LMSC and MAC will meet on Apr 22 and for another exchange of ideas, and another presentation may be made at MSC on Apr 24, if all goes well. A meeting is scheduled at MSC on Apr 26 to discuss the Agena "D" secondary propulsion system, multiple restart system, and C&C. ✓

g. S-27: LMSC has directed DAC to proceed with design and installation of a mechanical latch and a third band on the S-27. DAC has requested 2,000 hours of premium overtime for S-27 hardware design to assure availability of hardware in sufficient time for the S-27 systems test program. This request is being looked into and we will report the findings at a later date. ✓

H.H. These kinds of abbreviations are meaningless to me B

NOTES 4-23-62 Koelle B 4/24

1. FACILITIES BRIEFING FOR MR. HOLMES

The environmental facilities briefing will be given to Mr. Holmes on May 1 at 2 p.m. Dr. Rees has made this appointment and will attend. Mr. Carter and Mr. Ball of this office will make the presentation.

2. EARTH-PLANETARY SYSTEM STUDY

HHK O.K.,

One of our system studies concerns the requirements of an early Mars trip (fly-by) to help determine NOVA payload requirements and useful data for future nuclear reactor characteristics. We have received bids from Ford Aeronutronics, General Dynamics/Astronautics, GE, Lockheed, Martin, NAA, STL, and United Aircraft. The Source Evaluation Committee under the chairmanship of Harry Ruppe is recommending Lockheed and Aeronutronics for contract award. Each contract award is approximately $100,000. Do you want a copy of the evaluation report? Do you go along with our recommendation? Yes B

3. APOLLO MISSION - PROBABILITY OF SUCCESS

A few months ago we did a detailed study in this area for all modes of interest. We first broke down each mission into forty to fifty functional steps, and gave each step a probable value, and a lower and upper limit. Then we employed Monte Carlo techniques to determine the relationship of confidence level in the first success versus time. We now have the following data available:

a. Number of attempts required for one or more successes.

b. Time to first success.

c. Launch vehicles expended.

d. S-IVB stages expended.

e. Spacecraft expended.

The following modes were considered: Docking mode and Loxing mode with and without spares, lunar orbital operations, C-5 direct mode, C-5 nuclear direct mode and NOVA. These estimates are based on presently assumed schedules (Maus Master Schedule). While we have concentrated on developing the method, we believe that the results are already quite interesting. However, the assumptions can stand some more refinement - we would like to show you our figures in a little informal briefing, if you are interested.

Yes, I am.
B

NOTES 4-23-62 KUERS B 4/24

* gm

1. S-IV Stage: Representatives from this division visited the Douglas Aircraft Facilities at Santa Monica and Long Beach for the purpose of reviewing the manufacturing processes being used in the honeycomb bonding operations. Following are some of the discrepancies which were observed in their processes: (1) the cores were not being degreased subsequent to contour forming and prior to bonding, (2) the cores were not being bonded together prior to being attached to the skins, and (3) the outer edges of the core cells were being crushed or distorted as the cores were compressed into the panel frames. At this time it is difficult to properly evaluate and assist contractors in such new areas due to limited availability of in-house know-how. This division, however, is now in the process of setting up a small bonding facility within Building 4707. This is a project under $50,000 and provides 4,000 sq. ft. of floor area for this purpose including a clean room. The Autoclave will accomodate bonding of panels up to 8 x 10 ft. Completion is expected at the end of this year. This facility will give MSFC the capability to study, experiment and evaluate bonded structures on a small scale. This project is fully coordinated with P&VE and Quality Division. ✓

Use only well known abbreviations, please. jcm

NOTES 4-23-62, Lange B 4/24

1. C-1: Current indications are that the engine bearing difficulties will cause a six weeks slip in the completion of the SA-3 static test. SA-3 will be removed from the stand about 6-12-62. Slippage of launch date due to this delay has not been finalized. Delay in SA-3 may have significant effect on availability of a M-QUAL checkout station for SA-5. This is being investigated further.

CSO Scope of Work is being finalized for forwarding to CSD this week with a contract award target date of 6-30-62.

Work has been initiated to replace the S-IV All Systems vehicle LOX tank which now is scheduled to arrive at SACTO Nov. 62. This replacement delays delivery of the dynamics stage by about 8 to 10 weeks. The entire MSFC test schedule for the dynamics and propellant loading program is being re-evaluated. ✓

2. C-5:

S-IC - The first Ad Hoc meeting to define responsibilities between MSFC and Boeing was held on 4-20-62. Membership was established and action items identified. Initial inputs and recommendations will be forthcoming on 4-27-62.

On 4-17-62 a meeting was held with P&VE and concerned divisions to discuss and resolve a method of procurement of long-lead time components for P&VE. It was resolved that procurement of these items during FY-62 will be through competitive bid, with the exception of suction ducts which will be sole-source from Flexonics. No long-lead time components will be purchased through Boeing. ✓

S-II - On 4-18-62 the agreement for use of Seal Beach ~~has been~~ WAS signed by Assist. Sec. of Navy & NASA Hqs. ✓

C of F money for the A-E of S-II facilities in the amount of $536,000 has not been released from Hqs. It is understood that the Bureau of Budget is holding the request. ✓

Hqs indicates that approval of R&D funds for the S-II C of F may not be forthcoming in FY-62. Delays already incurred during the last 3 months will be added to during the next 3 to 4 months. ✓

S-IVB - On 4-20-62, a detailed and complete status report was forwarded for use in the Management Council Meeting on 4-24-62. ✓

3. Apollo: MSC forwarded to MSFC for comment a proposal for mission changes on SA5-10. Main change is elimination of reentry tests on SA-7 and 8, to be replaced by orbital systems test of Apollo spacecraft. Delivery difficulties at NAA of heat shields and emphasis on successful manned orbital flight on SA-111 are the reasons. ✓

Lange
It still held up,
I suggest Emergency Action
B

NOTES, 4-23-62, Maus B 4/24

1. ORBITAL OPERATIONS - Work Groups on the Lunar Orbital Rendezvous Study have their general review meetings this week. During the week of April 30, we expect to have the first set of performance and weight numbers. ✓

2. MANIPULATORS AND HANDLING DEVICES - An exploitation of the possible use of AEC tele-controlled manipulators and handling devices for space work is being prepared by Joe de Fries and will be ready this week. ✓

3. FUNCTIONS OF ASSISTANT FOR CONTRACT MANAGEMENT - At the request of Mr. Gorman, we are studying the organization and staffing problems of managing approximately 75 major contractors with a total volume of over $2 billion. This study involves several phases:

Responsibilities of Mr. Huth as Assistant to Mr. Gorman, in the business management of contracts. ✓

Technical management of contracts through the project offices with assistance of MSFC divisions and Michoud Operations. ✓

Relationship with WOO and other NASA elements. ✓

Relationship on funding and staffing between MSFC and DOD agencies. ✓

Because of the magnitude of this problem, we are utilizing the consultation services of the Ordnance Management Engineering Training Agency which has consultants experienced in similar problems with other agencies. Mr. Constan has just presented a staffing requirement of 310 civil service employees for his organization. Mr. Huth has been requested to submit a staffing plan for contractors not associated with Michoud. It is anticipated that a comparable number will be required. ✓

Mr. Gorman has indicated that Air Force may have neither funds nor the spaces to provide an extension of their present assistance to NASA. In fact they may reduce the number at Canoga Park. !

This all indicates a possible problem in living within the 7200 and 8000 spaces for FY 63 and 64 respectively, particularly in view of the space requirement of LOC. We will make a thorough analysis of these problems which is anticipated to require 60 days. ✓

4. PERT - A proposed MSFC policy on Implementation of PERT is being coordinated with organizational elements concerned, and will be released for publication this week.

Dr. von Braun: I do not select items from Mr. Maus' or Mr. Gorman's NOTES to go to Mr. Holmes. Items included only if marked by them.
JCM 4-23 ✓ B ✓

B 4/24

NOTES MRAZEK 4-23-62

1. STATUS OF BOEING PERSONNEL: Boeing personnel working in this Division as of 4-18-62 - 196. 11 additional are expected by the end of April. ✓

2. S-IV: A review meeting with DAC materials personnel on 4-17/18-62 disclosed that the S-IV heat shield and flexible curtains require additional testing, especially shock and vibration under the anticipated thermal environment. Thus far, material has been tested in a static thermal environment only. Furthermore, shock and vibration testing on adhesives of the common-bulkhead at cryogenic temperatures are required. ✓

3. S-IVB: Design capacity of 230 K is compatible with following applications: C-5, three stage escape - 225K Wg; R-1, EOR mode - 225K Wg; C-1B, two stage orbit - 223K Wg; C-1B, three stage escape - 189K Wg. Diameter of 260" was selected as design choice for three principal reasons; more favorable overall length, more favorable vehicle dynamic response, increased flexibility in spacecraft and "cargo" diameter. Optimized M-III stages require 2xJ-2 propulsion and propellant loads ranging between 310K and 425K, not compatible with growth capability of 260" S-IVB stage. O.K. → O.K. Good. B

4. MATERIALS PROBLEMS: Within the Materials Branch, we are presently involved in the largest number of failure analyses and urgent projects simultaneously of any time in our history. Currently, there are at least 25 different projects. This is alarming. Will request a 2-page summary B - next note.

5. LONG LEAD TIME HARDWARE FOR C-5 PROCUREMENT: A meeting held on 4-17-62 resulted in the decision to procure through MSFC P&C rather than through Boeing. Loss of direct technical supervision was of prime concern. ✓

6. C-5: Development of systems criteria and documentation for release as a basis for initiating configuration and weight control is essentially complete, utilizing propellant capacities of 4.4M in S-IC, 930K in S-II and 230K in S-IVB. These configurations are not optimized, but represent careful balance of intuitive design choice decisions aimed at preserving mission flexibility throughout the range of applications. ✓

7. TANKER STATUS: Preliminary design of T-1 LOX tanker is well advanced with target date for first cut 5-4-62. Selection of engine sizes for transfer maneuvers, rendezvous and docking is under way. Also expulsion system. Resolution in these areas, along with docking dynamics, may be expected to excede target date for first pass substantially. Interim report will be prepared early in May. ✓

8. INSTRUMENTATION: Friday, 4-20-62, we had a discussion with M-ASTR and M-RP on the instrumentation slice for C-5. For the first time we obtained complete information on instrumentation, heat generation and temperature limits. We agreed on the instrumentation slice to be separated from the S-IVB or S-II with an interlocking arrangement. The most efficient heat dissipation cooling system will be presented as soon as available. We also agreed on a fuel cell approach for the power source. ✓

Notes 4-23-62 Rudolph

B 4/24

1. Shea's Office - Organization and Support Groups.

Inclosed chart (Incl 1) reflects the most recent thinking and developments, as related by Shea on his visit to my office on April 10.

I have marked areas of special interest in red in the chart. ✓

2. Shea's interest in MSFC people for his staff in Washington does still exist. He mentioned deFries and Digesu to me, as having possibilities to be fitted in his Washington office. ✓ I think we need them here, both!

3. Visit of Shea's JPL (and Bell Comm) people to MSFC.

Eberhard Rees called me: Cole (leader of JPL group) wants to come with his people to MSFC for orientation.

Eberhard has only very briefly spoken to Shea on it.- Shea indorsed it.

Eberhard thinks Bell Comm people should get orientation at same time as JPL people, and since both groups will play leading parts, it is worth effort by presenters of MSFC.

No need for you or Neubert to get involved. (I talked briefly to Neubert). I will handle.

Topics to be presented and discussed as established by Eberhard. (See Incl 2)
Time 2 days, in week of 7 May 62.
Further intended discussion by Eberhard or myself with Shea did not take place. I will clarify on my trip this week to Washington. ✓

4. My visit to Washington to participate in briefing of Bell Comm personnel by Shea and his staff. (Note: Shea will go to Council Meeting though). I and members of my staff will participate in above for most of this week.

I plan to be back in my Huntsville office by Thursday 26 April.

5. Air Turbo Rocket Engines for basement boosters.

During my stay with the Army, we promoted project for development of adapted Jet Engines (Air Turbo Rocket Engines) for first boost stage.

Expected ISP: 600-700

Could be clustered. Might be well suited for recoverable basement boosters.

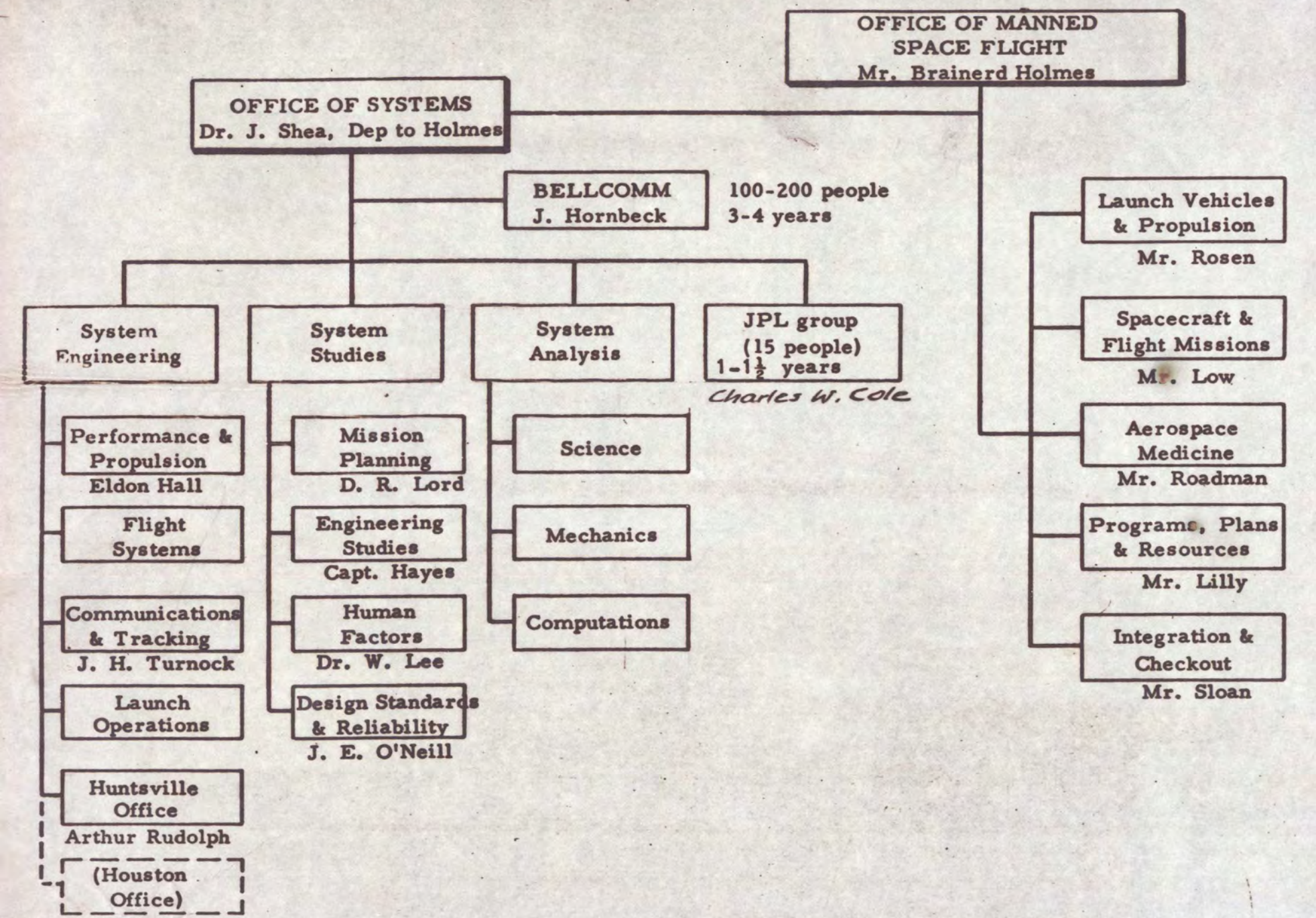
I could arrange for briefing by my former Army associates.

Will send Koelle copy (of this par 5) A.R. please do that. I'm too busy at this time.

He may have considered it already.

✓

As of 4/10/62


OFFICE OF MANNED SPACE FLIGHT
Mr. Brainerd Holmes
OFFICE OF SYSTEMS
Dr. J. Shea, Dep to Holmes
BELLCOMM
J. Hornbeck
100-200 people
3-4 years
System Engineering
System Studies
System Analysis
JPL group
(15 people)
1-1½ years
Charles W. Cole
Performance & Propulsion
Eldon Hall
Flight Systems
Communications & Tracking
J. H. Turnock
Launch Operations
Huntsville Office
Arthur Rudolph
(Houston Office)
Mission Planning
D. R. Lord
Engineering Studies
Capt. Hayes
Human Factors
Dr. W. Lee
Design Standards & Reliability
J. E. O'Neill
Science
Mechanics
Computations
Launch Vehicles & Propulsion
Mr. Rosen
Spacecraft & Flight Missions
Mr. Low
Aerospace Medicine
Mr. Roadman
Programs, Plans & Resources
Mr. Lilly
Integration & Checkout
Mr. Sloan
PLANNING AND MONITORING
IMPLEMENTATION

Briefing and Discussion Topics for JPL and Bell Comm by MSFC

B 4/24

C-1 and C-1B Launch Vehicle

C-5 Launch Vehicle

Our work on earth orbital mode (tanking mode and connecting mode)

Launch Concepts

Automatic Checkout

Guidance schemes for C-1, C-1B and C-5 for earth orbital modes

Status of the "Bug" mode study and our views on this.

Status of our studies on PROSPECTOR with C-1B capability and C-5 Capability

Status on NOVA studies and present concept

✓

Time: 2 days, in week of 7 May 1962.

Ind 2

NOTES 4-23-62 Stuhlinger B 4/24

1. VISIT TO JPL: Dr. Lundquist and I spent a day at JPL (Mr. Cummings, Mr. Small, Dr. Eimer, and others) to discuss various aspects of an unmanned lunar landing project based on Saturn C-1 B. JPL recommended that this new project not be called "Prospector", but that it be given a new identity which emphasizes its close relationship with the manned program, and also the very strong backing which the unmanned landing project is receiving from Dr. Shea. I believe that a very successful joint JPL-MSFC project will develop if so desired by Dr. Shea and MSFC. (See special memorandum on this subject.) ✓

2. VISIT TO BOEING: Dr. Lundquist and I visited the Technical Staff and the Scientific Research Laboratory of Boeing on April 17 to discuss research activities. We were greatly impressed by the large amount and the high quality of their research activities, many of which are in areas in which MSFC is vitally interested. I am sending a number of special information memorandums to MSFC divisions to encourage and initiate direct contacts with Boeing. ✓

* 3. SUPPORTING RESEARCH: A revised MSFC FY-1964 Launch Vehicle Technology Preliminary Budget Estimate has been prepared for submittal to OART. We were asked by OART to rework our previous FY-1964 preliminary budget submission because it did not conform to OART guidelines. (This lack of conformity should be understandable to OART, since their guidelines had not been received by MSFC at the time the previous submission was being prepared.) A summary of the revised FY-1964 budget estimate, which included figures for FY-62 through FY-69, is as follows:

FY-1962	FY-1963	FY-1964 - FY-1969
$10,862,000	$31,809,000	$40,850,000 per year

These figures for FY-1963 through FY-1969 are based on maximum desired programs; no funding restraints were imposed. ✓

4. LH_2 IN SPACE: Mr. Jones of our Space Thermodynamics Branch will visit Arthur D. Little this week to discuss the results of their study contract concerning problems of LH_2 in a space environment. Dr. Lange has been informed. The contract is supervised by NASA Headquarters. Headquarters plans a meeting in mid-May at Langley between A. D. Little and contractors working on Apollo and the Saturn stages to make the A. D. Little work more practical. ✓

5. RPD MOVE TO BLDG. 4723: Mr. Neubert informed us last week that MSFC has now obtained Bldg. 4723 from the Army and that RPD should prepare to move there. We have already delivered our recommendations for renovating the building; as soon as the building is ready we will move in. ✓

NOTES WEIDNER 4-23-62 B 4/29

1. M-1 ENGINE PROGRAM: The required funds authorization from NASA Headquarters to issue the letter contract has not been reviewed as yet. A meeting was held with Aerojet on 4-17/18-62 to further define the development plan, A subsequent meeting was held on 4-19/20-62 at Aerojet to evaluate Aerojet's efforts to date in facilities planning.

2. J-2 ENGINE PROGRAM: Two more engine system tests were made with a low thrust level attained. This low level was due to reorificing in the Lox discharge line after the thrust over-shoot of a previous test. Gas generator ignition tests on all of the modified injectors have proven unsatisfactory at low LOX injection pressure except the integral augmented spark igniter modification. This model will be tested during the next report period. It should be pointed out that during engine systems tests the injection pressures have been much higher than originally anticipated.

3. F-1 TURBOPUMP: The first Lox/RP-1 on an F-1 Turbopump on BRAVO-2 (since tests were halted after 3 pump explosions) was run 4-16-62. The test was programmed for 10 seconds at 1250 K thrust level. The transition to steady state was successful. After approximately 7 seconds, a gas generator malfunction (as yet undetermined) terminated the run. Apparently the turbopump operated successfully. It is now in the process of being inspected.

4. H-1: (SA-3 LOX TURBOPUMP BEARINGS) SA-3 static test schedule has been interrupted for disassembly of four or five engines (positions 2, 4, 5, 6, and possibly 8) to inspect the LOX pump bearings. Higher than normal gearcase vibration levels on the SA-3 engines - and a previous similar experience on SA-T in which a scored LOX pump bearing was found - was the basis for this decision. Engine position 2 was found to have a scored LOX pump bearing. As yet, no explanation for this has been found. Position 6 was disassembled on 4-19-62. The bearing was found to be in good condition. The other engines are in the process of being disassembled.

5. S-IV: The battleship test program at Sacramento has slipped approximately 3 weeks due to a lag in build-up from single engine to six engine configurations. Cold flow tests are now scheduled to start 5-19-62 and hot firings 6-9-62.

Helium bubbling of the S-IV LOX suction lines has been performed with engine # 1708 on the battleship stand at Sacramento. Bubbling results correlate well with predictions but heat-up rates are not finalized pending re-evaluation of the data and further bubbling tests.

April 30, 1962

NOTES 4-30-62 GORMAN B 4/30

1. INDUSTRIAL CANAL - MICHOUD - You may be aware that the Industrial Canal connecting the Michoud plant with the Intracoastal system is privately owned by the New Orleans East Corporation. We have been in contact with officials of New Orleans East and are confident we can work out a satisfactory lease arrangement for nominal cost. We are holding out for a lease which would permit NASA barge movement in the Industrial Canal on a non-interference basis. This simply means that we would have the authority to stop other traffic in the canal if it disturbed or interfered with our own barge operations. ✓

2. CONGRESSIONAL VISIT TO MICHOUD AND MISSISSIPPI TEST FACILITY Congressman Jensen, of the House Appropriations Committee, visited Michoud and the Mississippi Test Facility last week. He appeared to be completely satisfied with the Michoud plant, but was less than friendly about NASA's decision to buy land in Mississippi. He asked George Constan to submit a report directly to Congressman Thomas by Tuesday, May 2, on the considerations which led to the Administrator's decision to acquire the Mississippi site. This came to my attention on Saturday. I contacted Siepert in Washington and learned that Seamans, Holmes, and Ulmer were to appear before the Thomas Committee at 10:00 this morning to defend NASA's C of F budget. We worked up the report over the week end. Shepherd delivered several advanced copies to Siepert's office this morning for review before transmittal to Mr. Thomas. A copy of our report is available if you care to see it. ✓ Yes B

3. SLOAN FELLOWSHIP WINNERS - Our two Sloan Fellowship winners, Robert G. Voss, Propulsion and Vehicle Engineering Division, and Spencer E. Smith, Quality Assurance Division, have been approved to attend MIT for one year beginning June 15, 1962. ✓

4. TRANSPORTATION - General McMorrow readily agreed to the assignment of Major R. R. Jones, AOMC Transportation Office, to assist us in the development of overall transportation plans covering the movement of the C-1 and C-5 stages. Jones will be on this assignment for about three weeks. If he is as good as his advanced notices, we will probably ask for his permanent assignment to MSFC. -- With regard to surface transportation, the red and green bus line system is going into effect this morning. The taxi service will be instituted for traffic between here and downtown Huntsville. Our taxi drivers will soon be supplied with minimum type uniforms and a training program to include chauffeur's courtesy, etc. ✓

5. VISITOR CONTROL - We are proceeding with the plans to establish our Visitor Control desk in the lobby of Building 4488. Tentative agreement of AOMC has been obtained and a layout of the area required is now being prepared for their final approval. We are also investigating the possibility of providing uniforms for the visitor receptionists. ✓

Harry, You are aware of the fact that I do not mark items on your NOTES for TWX to Holmes - JCM 4-30

NOTES 4/30/62 - CONSTAN

B 4/30

1. RENOVATION AT MICHOUD

a. General:

Initial modifications to the Michoud plant are approximately 93% complete. This effort is scheduled for completion by June 1, 1962.

b. Office Building:

Marshall (Civil Service) personnel are scheduled to move to their permanent quarters by May 15, 1962.

c. Engineering Building:

This building is scheduled for completion by June 1, 1962. Portions are now occupied by contractor personnel.

2. CONGRESSIONAL VISIT

Congressman Ben F. Jensen, Republican, Iowa, member of the House Appropriations Committee visited Michoud on April 22, 1962, and requested information relative to the need of activating the Michoud facility and establishing the Mississippi Test Facility. He further requested information as to how these locations were chosen. This information is being forwarded to the Director's Office for transmission.

3. ARCHITECT-ENGINEER

The AE (Vector Corporation) has set up an office at the Michoud plant and work is beginning.

4. CHRYSLER CORPORATION

Tools, jigs and fixtures required by Chrysler are now authorized for procurement commensurate with funds available in present contract for this purpose.

NOTES 4-30-62 DEBUS B 4/30

1. Titan Siting: At the request of NASA Hqs, I will brief Seamans on the latest siting proposals for Titan III in the new land area. I will brief you on the outcome when I return.

2. GSE Functions and Responsibilities (MSFC/LOC): Clark is preparing a summary of our meeting held on 26 April at the Cape. I will forward you a copy to concur in our understanding of the items discussed.

3. Saturn #2:

(a) Automation: Commutated telemetry data were analyzed for "go-no-go" by real-time computer printout at T-340, T-20 and T-10 during SA-2 countdown. Flight data were also processed in real-time printout. Mr. Sloan was extremely impressed.

(b) Acoustics: Far Field acoustical measurements were very close to preflight predictions. These predictions were based on theoretical considerations modified by SA-1 observations. The far-field sound pressure level was nearly that of the first Saturn.

4. Nova Facilities Study: As a result of the decisions reached at the Management Council Meeting of April 24th in regard to Nova Facilities Study, this office has taken action to delay the Nova Facilities Study contract to be awarded by LOD.

5. General Electric Integration Contract: Mr. John Ellis, who will be the G. E. representative at AMR in charge of the Apollo Integration Contract, and who is also the man assigned to work with this office, was here to discuss the mode of operation for the study phase. Three representatives will be located with POD (Preflight Operations Division, MSC), three with LOD (one in Huntsville with Mr. Poppel).

6. IBEW Walk-off on Complex 37: Union members walked off Complex 37 April 23 thru 25 in protest of firing of 6 electricians. They returned on April 26. None of the other crafts participated. Paul Styles is scheduled to have a "show cause meeting" with the interested parties and the local missile site labor committee April 30 to obtain agreement that this type activity will not occur again.

7. Real Estate Acquisition: Real Estate Directive Nr. 9 has been issued requesting that the balance of available funds, $3.8 million, be used in acquiring the land in Area II-North, starting immediately south of Banana Creek.

8. Atlas-Agena-B: The cause of the spacecraft malfunction has not yet been determined.

9. Centaur: Rescheduled for May 9 subject to Range availability. Will keep you posted.

B 4/30

NOTES - GEISSLER - 4-30-62

1. AUTOMATIC LANDING FOR LUNAR EXCURSION VEHICLE (LEV): Guidance Scheme Studies were initiated for the LEV, including both descent from lunar orbit to moon surface and return to lunar orbit rendezvous. ✓

2. ON-PAD WIND LOADS: Langley Field has been requested to evaluate the SA-5 vehicle on-pad wind loads based on SA-1 wind tunnel data. It is nearly impossible to extrapolate or calculate the oscillatory drag and lateral loads, so wind tunnel tests will be required. Of interest to Langley and our own people would be some optical coverage on flight vehicles at the Cape. Deflections and frequencies at the nose (especially on manned vehicles) are needed. There is practically no data with which to correlate wind tunnel data for scaling effects. A group effort and good planning for a good measurement program on SA-3 and SA-4 will be attempted and coordinated with M-P&VE and M-LOD. ✓

3. CONTRACT: "ROCKET ENGINE ANALYSIS AND DECISION INSTRUMENTATION": It was found that M-P&VE has initiated a contract with Sperry Gyroscope concerning "Rocket Engine Analysis and Decision Instrumentation". This contract ($200,000) is very similar in its basic objective to the Saturn Operational Flight Control study by RCA except that the former contract is restricted to the propulsion area. Steps are being taken to coordinate these two contract efforts. Billy Swazek Looks like somebody goofed here! B

4. POTENTIAL WORK INTERRUPTION IN AEROBALLISTICS DIVISION: I have sent a memorandum to your office through Mr. Neubert, protesting the location of the Army's Redstone Information Center and a large vault in the midst of Aeroballistics Division's Operations. Installation and associated construction of these two projects is anticipated in the next few months. This planned installation will have a demoralizing effect on the Division as a whole, and the necessary personnel relocation problems will interfere with several extremely important technical projects which are already on a tight schedule. The memorandum suggests postponing the location of Redstone Information Center until the fall, but in addition presents several conditions which must be met if the proposed work cannot be postponed.

Dr. von Braun / Dr. Geissler: We discussed this memo in the morning staff meeting. It is our feeling that this should be discussed further between Mr. Neubert and Dr. Geissler. You should not get involved in it. JCM 4-30

ake
ulet

But I promised General McNamara 8 weeks ago that we will accomodate the Information Center now, because he said if we don't it might be (forever) assigned to another base. Also: we got Bldg. 423 on the basis of this agreement!! B

NOTES 4-30-62 GORMAN B 4/30

1. INDUSTRIAL CANAL - MICHOUD - You may be aware that the Industrial Canal connecting the Michoud plant with the Intracoastal system is privately owned by the New Orleans East Corporation. We have been in contact with officials of New Orleans East and are confident we can work out a satisfactory lease arrangement for nominal cost. We are holding out for a lease which would permit NASA barge movement in the Industrial Canal on a non-interference basis. This simply means that we would have the authority to stop other traffic in the canal if it disturbed or interfered with our own barge operations. ✓

2. CONGRESSIONAL VISIT TO MICHOUD AND MISSISSIPPI TEST FACILITY Congressman Jensen, of the House Appropriations Committee, visited Michoud and the Mississippi Test Facility last week. He appeared to be completely satisfied with the Michoud plant, but was less than friendly about NASA's decision to buy land in Mississippi. He asked George Constan to submit a report directly to Congressman Thomas by Tuesday, May 2, on the considerations which led to the Administrator's decision to acquire the Mississippi site. This came to my attention on Saturday. I contacted Siepert in Washington and learned that Seamans, Holmes, and Ulmer were to appear before the Thomas Committee at 10:00 this morning to defend NASA's C of F budget. We worked up the report over the week end. Shepherd delivered several advanced copies to Siepert's office this morning for review before transmittal to Mr. Thomas. A copy of our report is available if you care to see it. ✓ Yes B

3. SLOAN FELLOWSHIP WINNERS - Our two Sloan Fellowship winners, Robert G. Voss, Propulsion and Vehicle Engineering Division, and Spencer E. Smith, Quality Assurance Division, have been approved to attend MIT for one year beginning June 15, 1962. ✓

4. TRANSPORTATION - General McMorrow readily agreed to the assignment of Major R. R. Jones, AOMC Transportation Office, to assist us in the development of overall transportation plans covering the movement of the C-1 and C-5 stages. Jones will be on this assignment for about three weeks. If he is as good as his advanced notices, we will probably ask for his permanent assignment to MSFC. -- With regard to surface transportation, the red and green bus line system is going into effect this morning. The taxi service will be instituted for traffic between here and downtown Huntsville. Our taxi drivers will soon be supplied with minimum type uniforms and a training program to include chauffeur's courtesy, etc. ✓

5. VISITOR CONTROL - We are proceeding with the plans to establish our Visitor Control desk in the lobby of Building 4488. Tentative agreement of AOMC has been obtained and a layout of the area required is now being prepared for their final approval. We are also investigating the possibility of providing uniforms for the visitor receptionists. ✓

Harry, You are aware of the fact that I do not mark items on your NOTES for TWX to Holmes - Jams-70

NOTES 4-30-62 GRAU B 9/30

1. S-IV STAGE: Recent accomplishments in Quality Assurance at DAC are:

The electrical workmanship has been improved by starting a training program on April 23 in DAC training area with an instructor from the Quality Assurance Division.

The DAC Quality Control organization is showing increased effectiveness.

In the mechanical area, this Division has assigned one mechanical engineer to study the Quality Control requirements for the forward and aft interstage area. Also, one inspection specialist is investigating the Quality Control in the tank fabrication area.

The NASA Quality Publication 200-1 (Quality Assurance Provisions for Inspection Agencies) and supplementary product inspection requirements have been agreed to by the Air Force at DAC and Western Contracts Management Region. Manpower estimate is now at 57 for S-IV.

B 4/30

NOTES - HAEUSSERMANN, 4/30/62

* 1. INSTRUMENTATION MOUNTING FOR C-5: Meeting was held 4/20 between ASTR and P&VE personnel to finalize this matter. Arrangement providing a separate instrument unit (IU) with field splice attachment to S-IVB structure and the interstage has been selected. The scheme will be applicable to all S-IVB and S-II tanker configurations. Instrumentation will be mounted on vertical dovetailing panels which at vehicle assembly DAC will anchor to the S-IVB and ASTR will anchor to the instrument unit. On the pad all components will be accessible and exchangeable by means of circular platform located in front of the instrument panels. This walkway will be accessible through door in shell of IU. Antennas will be designed for external mounting and internal adjustment. Except for the access door, umbilical and stabilized platform areas, the entire circumference of the IU will be available for antennas. Fuel cell will be prime power source for C-1B and C-5 missions. Fuel cell will be augmented by batteries for peak current loads. Environmental control system will have capacity for both DAC and ASTR equipment and will be compatible with the fuel cell, ground, and in-flight conditions. Power supply and environmental control system will be MSFC's responsibility. ✓

W.H. We have complete and final say under the "Make or Buy" provisions in our contracts. Suggest you discuss this with Bill Davis. All you have to do is use your authority thru M-SAT, of course! B

2. USE OF COMPETENT SUB-CONTRACTORS BY PRIME CONTRACTORS: It is felt necessary that all stage contractors should be advised at top management level that development in specialized areas is to be handled by competent sub-contractors, rather than within their own company. Specific areas would include hydraulic and pneumatic actuator, digital and other electronic equipment. Recent case of DAC actuator and past histories with Martin/Orlando and Chrysler are examples of wasted time and effort by not utilizing competent sub-contractors. DAC is now pushing into electronics for control system logic. (In this case it is not even the contractor's responsibility as a part of stage development.) Also, Boeing claims competent capabilities in design and development of actuators, simulators, etc. Although there may be some cases where the aircraft manufacturers have capabilities equivalent to those of specialized vendors, it is believed that action should be taken to have the stage contractors confine their efforts within the areas of their prime capability.

3. MAJOR CONTRACTS FOR C-1 FLIGHT HARDWARE: Problems have been encountered in final scope definition on two major flight items: (a) Guidance Signal Processor (GSP-24) - IBM was selected as the logical contractor for this item which serves as a mission adaptor to the ASC-15 computer. IBM proposal amounts to 2.3M for engineering and six units. ASTR's estimate was 750K. Differential is attributed to differing interpretations of scope with the Reliability and Quality Assurance Programs being the principal contributors. Incremental funding was planned with 350K for FY 62. (b) ST-124 Reorder (15 months program) - Advanced information on EP proposal indicates 13.74M, compared to ASTR's 5.0M. Differential is attributed to EP including in their proposal more test equipment and tooling with associated engineering than ASTR intended for this period. These, plus higher costs for other line items are the principal contributors. Incremental funding was planned with 950K R&D funds, plus 400K reliability funds for FY 62. Every effort will be made to reduce the differential in both cases without jeopardizing the programs. We recognize, however, that we will not be able to reduce down to our original estimates. W.H.

I agree completely with your reasoning!! Take up w/ Lindstroem!

NOTES 4/30/62 Heimburg B 4/30

1. S-1-3:

Conclusions drawn in H-1 engine testing, to date, relating to gearbox problem:

K.H. That's bad! B

a. That grossly damaged No. 1 bearings can be detected with the vibration measuring technique given to Rocketdyne, but much more experience must be gained to distinguish very early failures. No technique will predict an impending failure.

b. The vibration measurements from cluster firings, single-engine firings, and turbopump cold flow tests are repeated on the same turbopump build (if care is taken to preserve identical measuring conditions).

c. Results from the tear-down and inspection of the gear-boxes indicate generally sloppy assembly as shown in outline below:

OBVIOUS DISCREPANCIES FOUND TO DATE ON S-1-3

ENGINE POSITION	OBSERVATIONS
2	No. 1 bearing failure
6	No. 2 bearing rotated on shaft
4	No. 3 bearing jet plugged
5	No. 1 bearing discolored; loose outer race accessory drive
8	No. 1 bearing rotated on shaft; No. 2 bearing rotated on shaft; loose outer race accessory drive

d. Accelerated gearbox testing is being carried out to provide statistical type data for determining gearbox deficiencies. ✓

* qcm 2. MARINE OPERATIONS:

Two high speed roll-on/roll-off ships (unemployed railroad ferry boats formerly used between Maimi and Cuba) were examined for intercoastal operations. Indications are that they could provide efficient, fast offshore service delivering space vehicles from Los Angeles, California, to Michoud in 10½ days. ✓

K.H. Action? B

* qcm 3. FACILITIES:

Construction schedules for the Static Test Facilities (C-5) West Area, the new Dynamic Test Stand, the Instrument Laboratory, and the Second Addition to the Engineering Building were predicated on FY 1963 design funds being available on or about 4/1/62. They have not been received and no information from Washington through F.E.O. can be obtained as to when funding of these items will be consumated. When, and if, advanced design funds are received, new schedules must be prepared.

Urgent Action? (Dr. Heimburg) B

B 4/30

NOTES 4-30-62 HOELZER

H.H. Very good! B

1. REAL TIME ACQUISITION AND DISPLAY OF SA-2 TELEMETRY DATA: All eight telemetry links were received and recorded with excellent results. Selected measurements were displayed on a Sanborn recorder in the telemetry ground station room of Computation Division; this display was also made in real time in the Evaluation Center by the use of closed circuit television. Immediately following the flight, additional measurements were presented on oscillograph by playing back the recorded signal.

2. REDUCTION OF RANGE RECORDED TELEMETRY DATA: Range recorded telemetry data were received by Computation Division at 3:00 p.m. on Wednesday, April 25. All telemetry links, with the exception of vibration data, were converted to digital form by midnight on April 25. Linearizing and scaling of these data by computer was virtually complete by midnight on Thursday, April 26. ✓

3. SINGLE SIDEBAND (SSB) DATA: Single sideband data were received at approximately 3:00 p.m. Wednesday, April 25, and were delivered to Astrionics Division to be re-recorded for reduction by the Vibration Unit. This task was finished at approximately 7:00 p.m. on the same date. However, the nature of the data reduction for single sideband is greatly different from the reduction of straight FM/FM measurements. It is hoped that with familiarization of single sideband data the task of reducing the data will be expedited. All third octave and quick-look data for SA-2 were completed by April 28, and work on routine analysis of the data began that day. However, all quick-look and third octave data for the straight telemetry channels were completed and sent to the respective customers on Thursday, April 26. ✓

NOTES 4-30-62 HUETER

B 4/30

1. CENTAUR:

a. F-1: The launch of Centaur F-1 has been rescheduled for May 9. There is, however, an apparent range conflict which may necessitate a delay until May 10. LOD is trying to resolve this problem. In support of the May 9 schedule, it is planned to run the FACT (plugs out) May 1 and the Composite Readiness Test (CRT) on May 4.

b. Centaur Development Plan: The Centaur Project Office presented a preliminary Project Development Plan to OSS on Friday. Essentially, OSS is in agreement with the basic development approach; however, they are not willing to accept the resultant slip in schedule or the higher program costs. There are basically two ways by which the costs can be reduced: (1) Extend the time span for the 10 missile program in order to save money by buying missile hardware at a later time or (2) to reduce the ground testing program and accept higher flight risks. The Headquarters people, Col Heaton and Cmdr Schubert, are inclined to cancel some of our propulsion tests or more elaborate checkout procedures in an effort to reduce costs and simultaneously meet better flight schedules. Our agreement was that OSS personnel will use our proposal and reduce costs and improve schedule by rearranging our program. We, from our side, will make an effort to reduce the cost by a program stretch since we are convinced that anything less than what we propose in ground testing is gambling and is not sound engineering as expected from MSFC. (See attachment - Left side of folder)

H.H. I have every indication that the Spacecraft schedules are slipping all over the place! Suggest you establish "clandestine" contact with Goddard to find out what's realistic and prepare a joint plan. B

2. AGENA:

a. Ranger 4: A brief recap of this launch is as follows: The Atlas and Agena-B performed beautifully, the spacecraft Central Computer and Sequencer apparently did not function and did not control the many events and activities programmed for the spacecraft. Lift off time was 2:50 PM EST on Apr 23; Lunar impact occurred at 6:49 AM EST on Apr 26. Time of flight 63 hours, 59 minutes, 39 seconds. Bus impact speed 2.669 KM/Sec. Selenographic latitude 15.5 degrees south; Selenographic longitude 229.5 degrees east.

b. Launch Dates: A substantial number of launch dates have changed for the Agena program. All of the Atlas Agena launches in support of the Gemini program have been rescheduled two months later. The Nimbus Meteorological Satellites, both R&D and Operational, have slipped approximately six months. The Orbiting Astronomical Observatory (OAO) launch date is under study and may slip some ten months. The Eccentric Orbiting Geophysical Observatory (EGO) and its backup are under study and probably will slip about four months. All of the above is the result of spacecraft delays. See what I mean?

c. Mariner R: Range Safety Division of AMR has granted a waiver of the Independent Agena destruct system requirements for the Mariner R missions. The conditions associated with this waiver are that the Atlas destruct capability be extended from Sustainer Engine Cutoff to Vernier Engine Cutoff and the Siegler Kill and Impact Probability Study for Ranger missions be updated for Mariner R. The launch azimuth sector for Mariner R has been restricted to 93° - 111°. A request will be made for an extension of this sector to 90° - 114°.

d. Gemini: In a meeting at Houston on Apr 26, the Agena propulsion, mainly the secondary propulsion, multiple restart and pressurization systems, were discussed. Also discussed were the ground station requirements and other communication and control items for the Gemini target vehicle. In regard to the secondary propulsion and multiple restart systems, LMSC will complete tank thermal environmental studies before go ahead authority on the metal bellows propellant expulsion system is considered. This device looks very promising and may have applications on other vehicles, including the Saturn program.

Why should it be better with Centaur ??

You surely deserve a big pat on the back for this feat. Please pass this on to Juers & Co. B 4/30

NOTES 4-30-62 Koelle

B 4/30

1. ALTERNATE NOVA

Because of the recent decision of postponing the preliminary design study of the original (10 + 2 + 1) configuration, it appears unlikely that this configuration will ever materialize. I am now setting my goal higher for a NOVA which can carry twice as much, namely 1,000,000 lb or more to orbit at a specific transportation cost of 50 $/lb or less. (NOVA specific transportation costs were estimated at approximately 250 $/lb total operating cost.) The most promising concept which seems to satisfy this requirement appears to be Bob Truax's sea-launched concept of a pressure-fed two-stage-to-orbit reusable vehicle. I talked to him last week and he gave me a detailed cost and operations analysis which convinced me that we should look into this in more detail. While many questions remain to be answered, it has all the basic features desired for such a vehicle class and is definitely one of the more promising possibilities. I would like to give you a short briefing on this very soon. If you desire, we also can place it on the agenda of the next Board Meeting. We are about to begin three studies with RAND, General Dynamics, Astronautics, and possibly Douglas on conceptual designs of vehicles which, up to now, have been called "Post-NOVA Class." Another point to be discussed in this connection is what we propose should be done with the 2.3 million dollars earmarked for NOVA. I do have a proposal to offer! Let us make sure that we do not lose this money.

No. Jam NoB

HHK Yes B 4/30

2. C-5 DIRECT MODE

You wanted to call Dr. Shea and tell him that we are willing to give STL a study contract on this subject for about five months duration at a level of effort up to $100,000 a month. Please let me know his reaction and your guidelines on what to do. I have enough material to write a work statement along these lines. A sole-source justification is also needed. We've discussed this B

* Jam

3. SOLID-NOVA VEHICLE DESIGN STUDY

The Boeing Company study (Study of Large Launch Vehicles Utilizing Solid Propellants) has been extended for 6 to 7 months to obtain preliminary designs of NOVA-class vehicles.

Two basic configurations are to be studied: (1) a 4-motor cluster, and (2) an 8 x 156" cluster (included at request of NASA Headquarters), both with M-1 powered second stages. In addition, the Air Force (Edwards Rocket Base) has selected Boeing to perform detailed studies of clustering structure and thrust vector control for C-5 and NOVA class vehicles (about $450 million total effort). We are working out arrangements with the Air Force people to make these efforts complementary, and probably will record them in a single set of reports for NASA and AF use.

↓ ??? You could develop a rocket [illegible] that!

NOTES 4-30-62 KUERS B 4/30

Negative Report.

NOTES 4-30-62, Lange

1. C-1: Bearing Problem - No precise means of identifying good or bad bearings through instrumentation has been determined yet. On 5-1-62 a meeting will be held with Rocketdyne to cover all aspects of the problem for immediate and long range solution. Once the date for removal of SA-3 from the static stand is finalized, every effort to reduce the processing time for the remaining operations will be made. Present plans with SA-4 are not to tear into any of its engines but to instrument them fully for the short static test. Any reschedule of SA-3 & 4 will be performed so as to minimize any interference with SA-5 schedule.

If a more detailed analysis of the SA-2 flight supports the quick look evaluation indicating a highly satisfactory flight, SSO likes to consider some type of additional mission for SA-3 & 4, as an engine-out demonstration or a hydrogen vent experiment. All possible missions will have to be carefully planned regarding manpower and time and should not detract from SA-5 effort. - The Board Mtg. on 4-27-62 decided to form an Ad Hoc group under SSO chairmanship to study these questions.

S-IV - The Battleship hot firing schedule is very tight, as a lot of equipment must be installed. DAC is hopeful to meet the 5-28-62 date of starting the test program.

2. C-5: S-IC - Based on indications that the MSFC request for a six month extension to the present Boeing preliminary contract will not be approved, SSO has proceeded to develop a scope of work which will define Boeing's total effort in the S-IC Program.

Contrary to the 4-17-62 agreement between P&VE and concerned divisions not to purchase long-lead time components for P&VE through Boeing, a follow-on meeting on 4-23-62 concluded that certain components required by P&VE should be procured through Boeing, in order to be consistent with MSFC's intention to develop Boeing as a systems contractor. Selection of these components and timing for procurement are being discussed between P&VE and SSO.

MSFC and Boeing started negotiations to issue a supplement to the preliminary contract covering ME tooling and hardware requirements, which is based on Boeing's proposal, but pending on clarification of the Purchase Request regarding COR and Techn. Supervisor responsibilities. P&C (Mr. Gorman) issued letter on 4-26-62 which reaffirmed and further amplified the original policy statement.

S-II - MSFC, WOO and Navy BUDOCKS met on 4-26-62, to draft a cooperative agreement on construction at Seal Beach. NAA is charged with A-E design and the Navy will construct the facilities. A Navy/NASA agreement was reached and will be delivered to Admiral Davis for signature 4-30-62. On 4-27, WOO, MSFC, and Navy met with NAA to inform NAA of the NASA/Navy agreement and to ascertain possible problem areas. NAA dropped a bomb by presenting new facility schedules which average a 3 mo. speed up in availability of these Seal Beach facilities. The contractor's answers to NASA questions were unsatisfactory with regard to the facility speed-up. The schedule discrepancies will be resolved between MSFC and NAA during the next two weeks.

C of F money for design only of S-II facilities was released by HQs on 4-23-62. Construction funds were not released and will cause further schedule slippage unless received by 6-1-62.

S-IVB - MSFC is holding request for approval of S-IVB facilities at SACTO until Santa Susana location has been evaluated. DAC's evaluation is expected by 5-18-62.

NOTES 4-30-62 Maus B 4/30

1. SPACE PANEL OF PRESIDENT'S SCIENCE ADVISORY COUNCIL - Mr. Rees and Mr. deFries attended a session of the Space Panel of the President's Science Advisory Council on Friday, April 27th, in Washington. Mr. Holmes and Dr. Shea gave a presentation on the OMSF organization and their future plans, particularly, the role of GE and AT&T. We have arranged an appointment at 2 pm today for Mr. deFries to brief you on the meeting and his later discussions with Mr. Holmes and Dr. Shea. ✓

Mr. Maus, Dr. von Braun would not read this until after this meeting-Sam ✓

2. PROPELLANT MANAGEMENT FOR MSFC - We are going to appoint Mr. Russell D. Walker as Propellant Manager for MSFC. Mr. Andressen and Mr. Goodrum, our Chief of Program Coordination Office, will discuss this assignment with Mr. A. S. Bass, Chief, Propellant Program, NASA, in Washington, tomorrow. ✓

3. HEADQUARTERS DIRECTIVE ON SCHEDULING and funding has been received and distributed internally for comment. Mr. Andressen and Mr. Foster will have further discussions on implementation of this procedure with Mr. Lilly, in OMSF, on Tuesday in Washington. ✓

H. M.

4. NASA LONG RANGE PLAN has been issued by Mr. Hyatt's office. We are reviewing this, trying to understand underlying reasoning. We could prepare a summary presentation for you if you desire. →

I've seen it myself. Would appreciate your appraisal in terms of conflictions with our plans and views

B 4/30

5. PACIFIC LAUNCH OPERATIONS OFFICE - We have made comments and an alternate proposal on the headquarters proposed charter for PLOO. We were not in agreement with their organizational concept for our senior representatives, and we proposed clearer assignment of budgeting and funding responsibilities. Mr. Andressen will discuss the PLOO organization and support relationships with Mr. Rosenberry in OSS today. ✓

↑ Please keep me posted.

B

NOTES MRAZEK 4-30-62 B 4/30

1. RIFT: The RIFT Source Evaluation Board completed evaluation of the proposals. Col. Scott Fellows is scheduled to present the findings of the Board to Mr. Webb on 5-4-62. The type and term of contract for RIFT is scheduled for discussion with Harry Finger at Headquarters at the same time.

The Bechtel Corporation contract for NERVA Conceptual Study will be completed on 6-2-62. Unless additional funds are made available, there will be a break in the Bechtel Study/Design effort until FY 63 funds are available. MVPO is working with NASA HQ on obtaining some funds to keep this work going.

2. TITAN III: Participation by Mr. Neighbors in the DOD/NASA Phase I Titan III evaluation was completed on 4-26-62. It is anticipated that a draft of the report will be ready for Dr. L. V. Kavanau in early May.

Generally, it appears that most of the panel members feel that the Titan III program leaves a lot to be desired. It is evident that much of this feeling will be edited out of the report by IDA (Institute of Defense Analysis).

A large number of problem areas have been documented by various panel members. Col. Heaton indicated that he thought a comprehensive program review and analysis of technical feasibility by MSFC would be necessary in the near future, prior to NASA commitments.

The Titan III program is handicapped by many major problems which are associated with at least eight major advances in vehicle technology.

Mr. Neighbors has some interesting observations. Do you want a short briefing?

3. OPERATIONS RESEARCH: The Advanced Flight Systems Branch has an established capability in operations research which complements the conceptual design and flight systems engineering activity of the Branch in important areas of mission planning, cost projection, scheduling, funding, and expected flight reliability history. In view of the established needs and utility of this work, P&VE Division plans to enhance the staff and capability of the Operations Analysis Section in the immediate future. Mr. Koelle agrees for this group to be with P&VE.

4. MSFC LH_2 PROGRAM: According to your instructions, the liquid hydrogen program was compiled. Proposed funding levels are shown here in millions of dollars.

	URGENT	FOLLOW ON
At Stage & Engine Contractors	9.9	2.1
At NASA Centers	2.2	2.0
OART Type Contracts	5.7	0.1
Totals	17.8	4.2

A total of $1.29 million was submitted to OART to be funded in FY 63. I realize that this is a Christmas shopping list. The breakdown as to different programs is being prepared.

5. LOR-EOR: With reference to the meeting on 4-16-62 with MSC on the "bug" mode, NAA came prepared for a fight and was surprised that no objections were raised in principle by MSFC. The interpretation made was that we had given up our earth orbit rendezvous (This was information received by the local NAA representative). Perhaps this should be cleared up with Gilruth at some opportunity.

NOTES 4-30-62 Rudolph B 4/30

Negative.

B 4/30

NOTES 4-30-62 Stuhlinger

1. HIGH WATER: The High Water experiment was executed as scheduled following the Saturn launch last Wednesday. A large quantity of observational data was taken, of which only a small fraction have yet been received at RPD. Valuable scientific results are expected. ✓

This is known - qm

2. LAUNCH VEHICLE TECHNOLOGY PROGRAM: As the May 1st deadline neared for submitting LVT actions to P&C for processing, we requested each of the divisions to submit their most urgent requirements for consideration in addition to FY 1962 projects which had been processed in our normal FY 1962 LVT Program. Due to a residual funding balance that had accumulated as contracts were finalized, we were able to add several of these requirements to the program. We have now sent to P&C contract actions which will utilize virtually all funds assigned to the LVT Program ($8.1 million). As contracts are ready for finalization, P&C will receive funding approval from FMO. Due to the overall shortage of FY-62 funds, it is possible that some of the LVT actions cannot be finalized into contracts. At the present time, contract actions for about $4.0 million wait for their finalization in P&C. In order to relieve the workload on P&C, this division will detail Mr. Ray Parsley to P&C on temporary duty. ✓

* qm

3. METEOROID STUDIES: An MSFC Meteoroid Damage Working Group has been established with representatives from RPD, P&VE, Aeroballistics and Astrionics Divisions. It is chaired by Mr. B. Quass, Systems and Instrumentation Branch, RPD. The purpose of the group is to establish the scientific merit of all applicable laboratory experiments with respect to simulation of meteoroid damage. The activities of the group have been approved by OART. During the past four weeks, the group has accumulated approximately 275 references on impact experiments and approximately 350 references on environmental conditions. In addition, the group is to determine the most desirable micrometeoroid experiments which might be carried on SA-5 and SA-6. ✓

NOTES WEIDNER 4-30-62

B 4/30

1. F-1 ENGINE PROGRAM: Thrust chamber 20-2 was severely damaged due to failure of a wide-baffle injector in the component test. This is the second failure in recent weeks of a wide-baffle injector. In both cases, the injectors had repeatedly performed satisfactory tests. In each case, tests were shut down when rough combustion suddenly developed. Investigation then showed damaged baffles.

F-1 engine serial number 005 was successfully run for ten seconds and 22 seconds. The thrust was 1400 K, highest since the resumption of testing after the last LOX pump explosion on 2-5-62. Post test inspection revealed a locally overheated area on the facility flame deflector.

2. RL10A-3 ENGINE PROGRAM: New vertical test stand E-7 is complete, and an engine has been installed for stand checkout.

3. H-1: Investigation of the bearing problems on SA-3 is proceeding. A meeting will be held with Rocketdyne personnel on 1-5-62 to firm up further plans and to decide on SA-3 action.

4. J-2 ENGINE PROGRAM: Status of C of F funds are the same as last report, still awaiting release from NASA Headquarters.

First J-2 engine had injector burn-through. A LOX pump exploded in component testing. Details of both events still missing.